

Iowa State Teachers' Association

...A... HIGH SCHOOL MANUAL

Issued Under the Direction
of a Committee of Twelve,
Appointed by The General
Association, December, 1899



✻ ✻ ✻ 1901 ✻ ✻ ✻

Des Moines, Iowa, December, 1901.

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Iowa State Teachers' Association.

A MANUAL FOR HIGH SCHOOLS,

Setting forth the Course of Study adopted by the General Association, a
discussion of each subject in the Course, and various other
matters of value to High School Teachers
and to School Boards.



Prepared by the Committee of Twelve appointed by the General
Association of the IOWA STATE TEACHERS' ASSOCIATION.

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R. C. HUGHES,
HILL M. BELL.

Committee.

Des Moines, Iowa, December, 1901.

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DEPARTMENT OF PUBLIC INSTRUCTION.

DES MOINES, DECEMBER 1, 1901.

By law it is the duty of the board of directors to prescribe a course of study for the schools over which they have control. This unfortunately results in a great variety of courses even though conditions are the same. The Twenty-Eighth General Assembly, recognizing the need and value of greater uniformity, authorized the superintendent of public instruction to prepare, publish and distribute a course of study for high schools. The State Teachers' Association having for several years, through a committee of twelve, been at work on a manual for high schools, it was deemed wise for the department to co-operate. This has been done most cheerfully.

The committee first studied the high school and learned its real condition; second, it ascertained the requirements for such a course as suggested by the National Educational Association; third, it considered the entrance requirements of Iowa colleges; fourth, it considered the whole question with a view to producing a course that would prove of the greatest value to pupils in general in our own high schools. I believe that no course heretofore submitted has been so carefully prepared. That it will be most cordially received, I have no doubt. That it will prove of inestimable value is unquestioned, if rightfully used.

While commending the Manual to boards of directors, we caution them against attempting to do more than can be well and thoroughly accomplished with the teaching force and equipment they have. The common school, of which the high school is a part, is for all the pupils, of all the people, and in it should be taught well the fundamentals of an English education. The Manual will assist in determining the subjects to be taught, the order and best method of presenting the same, and the amount of work to be done in a given time. It is a valuable contribution to the educational literature of the state.

RICHARD C. BARRETT,
Supt. Public Instruction.

Part I.

GENERAL INTRODUCTION.

A committee consisting of Thomas Nicholson, Chairman; A. T. Hukill, Secretary; H. H. Seerley, A. B. Warner, Lydia Hinman, J. J. McConnell, A. V. Storm, R. C. Hughes, A. W. Stuart, J. H. T. Main, R. A. Harkness, Charles O. Denny, was appointed by the General Association in December, 1898, to prepare a course of study for Iowa high schools, and to have in charge the preparation of a Manual for the same. This committee met at Iowa City in the following April and gave long and careful attention to the work committed to its charge. Frequent meetings followed, a report was made to the General Association in December, 1899, stating that the Chairman in consultation with other members early in the year had made an outline of subjects covering the chief points needing careful consideration, had assigned them to different members of the committee for investigation and report, and that these members had presented papers prepared with great conscientiousness and care to the committee at its general meeting. In these papers and the discussions which followed, the following points were considered:

What is the real condition of high school courses in Iowa? What are the requirements of the courses suggested by the National Educational Association? What are the entrance requirements of the colleges belonging to the College Department of the Iowa State Teachers' Association? How far do the general conditions of our high schools and their constituencies demand courses differing from the college preparatory course, and what attitude ought the college men to hold toward the high schools in this regard? Is it feasible to have one course in each high school which shall be specifically a college preparatory course? How far is it possible for all the high schools to have uniform courses and what can we do to bring them into general use? The comparative value of time, kind and quality in preparatory work. Is it feasible to have a high school manual which shall outline the kind and amount of work, give suggestions for proper equipment for the teaching of each subject, give suggestions about proper methods of teaching in the respective branches, as to text books and various other matter of importance to the school?

This committee elicited the fact that there was great confusion in our high school courses of study, that there was an utter lack of

uniformity, in estimate of the relative value of subjects and groups of subjects, and no uniformity as to the beginnings and the endings of the high school courses.

A vast amount of other information was secured and after frequent consultation among themselves and with leading school men throughout the state a course of study which follows on page 27 was presented to the General Association and unanimously adopted on December 29, 1899. At this time the committee presented a condensed summary of their discussions and of the principles which they had adopted in preparing their report and which they proposed to adopt in the preparation of the Manual which they suggested as a desirable publication. It has been thought wise to present here this summary of

GENERAL PRINCIPLES:

1. It was agreed that the aim of the high school was not to fit for college. People do not and will not consider it specifically a college preparatory school. No more is it a school to fit for business occupations, mechanical pursuits or any of the professions. Its specific purpose is **TO FIT ITS PUPILS FOR THE DUTIES OF LIFE.** It may become the duty of life to go to college, to engage in business, to practice law or medicine or any one of a hundred other conceivable things unforeseen by the pupil while he is in the high school. The aim of the high school course should, therefore, be to give the child a solid discipline of his faculties, a broad view of life, proper self-control, a trained judgment, an appreciation of educational values, proper methods of study and of work, an inspiration for life and for study, and such a command of himself and of all his powers as shall enable him advantageously and intelligently to take up any of the legitimate things which may become the **DUTY OF LIFE.**

2. The student will not, as a rule, remain more than four years in the high school, hence the course there given should be so arranged that the pupils who complete any well-ordered four year high school course should be admitted to college without conditions. Furthermore, the pupil, at the beginning of his high school course, cannot determine what course he should pursue if he goes to college; nor is he at that time competent to decide what college course he may take, as very few enter high school with the distinct idea of completing a full college course. It should, therefore, not be easier to enter one course in college than another. Under present conditions a student who has pursued a full four years' course without Greek or German enters the classical or the philosophical course in college at a disadvantage, since he is burdened with language conditions which must be made up, either at the expense of heavier work than that required of the scientific student, which is almost certain to endanger either his health or his scholarship, or at the expense of an extra year or a part of a year in college, which he will not and should not be required to take. The colleges should recognize that for the great majority of their Freshmen the high schools will be the place of preparation and they should so arrange their courses of study that four years of straight work of sound collegiate grade following four years of high school work of recognized grade should admit the candidate to any degree.

3. Hence kind and quality of work should determine rather than specific subjects pursued, provided such fundamentals as Latin, English and Mathematics be in every course. It was argued that no inconsiderable part of the advantage claimed for the discipline gained from four years of Latin arises from the fact that the student is held to the one study continuously, and term after term he must follow his own work in such a way that defects are sure to appear if there be any. By this process, also, he gains something like a mastery of one subject which is a very desirable thing. If physics, or botany, or history or any other subject taught by modern and sound pedagogical methods were to be pursued in the same way, so that the student be held to it term after term until he gained the advantage of a continuous discipline and an approximate mastery of the subject so far as it lay within the range of his actual or possible power, these subjects would gain very much of the advantage now claimed for language and mathematics. The committee, therefore, recommends that, wherever possible, the high school course be so framed as to provide for continuous study in a few subjects, rather than for superficial and limited work in a number. Physics, botany, zoology, chemistry and such studies should continue through at least one year, wherever undertaken, and should only be attempted where there is proper equipment for laboratory work. The school authorities should select the subject for which they can provide the best equipment, the best teaching force and which, owing to local conditions, will create the greatest interest among pupils and patrons, and secure the most thorough and scientific work. When these conditions are observed, the colleges will allow quite a wide range of choice in the selection of subjects from the same or from related groups.

It was shown that the spirit of the colleges was to require subjects which they can get rather than those which they desire, provided the work is shown to have sound educational value and is sufficient in kind and quality. There is a wide divergence in college academies

both as to subjects and grade of work, and in some instances they need to increase the educational value of their work if the college to which they belong is to retain its proper rank. Some thought it would be better for the college academies to outline a four year course rather than the present three years with a sub-preparatory year.

An interesting paper was read before one of the sections of the South-eastern Iowa Teachers' Association, showing that a careful investigation of the records of one of the best colleges in our state indicates that through periods of years the average record of students whose college courses had been pursued after a preparatory course taken in a high school with a four year Latin course and in the preparatory department of the college itself did not vary in any degree worthy of mention, while the average record of those who had been prepared in a four year English course in a high school fell from six to fifteen per cent below that of those in the courses above mentioned. The writer gave it as his opinion that this was accounted for by the fact that the English course is often, if not generally, made up in a scrappy way, and too frequently admits subjects which have not the sound educational value of those in the Latin course. He thought there was no evidence that the students from the English courses were in general below the others in native ability or in application.

4. In regard to the movement to shorten either the secondary or the college course to three years, it was agreed that we should insist upon four years in each. There should also be four years of grammar grade work, and it was considered all important that this should be carefully outlined and made of sufficient strength to preclude the necessity of forcing into the high school studies which properly belong in the grammar grades. Too many high schools are so only in name, a large percentage of their work being that which properly belongs to the grades below. All agreed that it was quite desirable to have Latin, German, (where taught,) concrete geometry and possibly one or two other such studies, begin in the grammar grades.

In view of the above, it was considered wise to allow pupils above the average in natural ability, or who for any reason show that they are able to do more than the regular work well, an opportunity to complete the course in a shorter time. The aim should be to fix the quantity of work, to make frequent and thorough tests of the quality, and let each student take the time necessary for him. Some strongly urged the wisdom of strict college entrance examinations, not on the ground alone of the good of the college, but as a stimulus to the pupils in the high school to do better and more thorough work, and that, for the same reason, rigid examinations set upon sound pedagogical principles are valuable in the high school itself; but it was agreed that under the present conditions, we must be satisfied with less than this ideal, contenting ourselves with the use of every possible endeavor to secure thorough mastery of subjects and a method of teaching which would give the student a clear grasp of the subject studied and a desire for and the ability to take up further study of that or any other subject independently.

5. It was shown that of nearly 800 schools listed in Iowa School Directory, 140 announce a four year course, 24 a three year course, 1 a two year course and 2 a one year course.

This would seem to indicate that nearly six hundred of these schools offer no work in any foreign language, and the best information which the committee could command pointed to the probability that a greater part of this large number of schools had courses decidedly inferior in educational value. They were thus met with the mournful probability that a very large percentage of our youth go out into life with a very defective preparation for its duties. This should be an incentive to the general Association and to all friends of education to join a campaign for arousing educational spirit throughout our state, to overlook minor differences and to unite on some scheme that will enable us to work together in harmony and educational fellowship and to exert all our strength to secure for the coming generation the fullest educational equipment for life's best work. There should not be and there is no conflict of interest between the high school and the college, and their courses should be mutually considered and should be framed in the light of a frank recognition and a vivid realization of the facts here presented.

6. The committee was unanimously of the opinion that all should unite in an effort to have schools of Law, Medicine, Pharmacy, Dentistry, etc., require at least the full four year high school course, or the full college entrance requirement for admission to these courses. The highest interest of the state and of the nation demands this preliminary equipment for these duties of life and for anything like proper efficiency in these professions.

7. All this indicates that the general Association and educators at large should agree upon a definite standard which any school must reach in order to be considered a high school at all. There is no reason why we should not set at least a minimum standard, as to number and kind of teachers employed, subjects taught, equipments, methods, etc. The committee saw no reason why within reasonable latitude of electives, the courses in one, two or three year high schools should not parallel those in the fully equipped four year high school, and it seemed desirable to work toward this end.

8. The committee considers it wise that the high school should have shorter recitation periods and usually more subjects than the college, because children are younger, are able to give continuous attention for a shorter period of time, have outside duties, because in the nature of things the foundation must be broad before specialization begins, and for numerous other reasons. A scheme calling for seventeen to twenty recitations of thirty to thirty-five minutes each per week was agreed upon as the best. The general sentiment of the committee was that in no case should more than four recitations per day for five days in the week, or twenty periods per week be prescribed.

9. There was quite a sentiment in favor of music, drawing and possibly manual training in the high school.

AS TO SPECIFIC SUBJECTS.

1. Mathematics offered no subject for controversy. All agreed that its place was fixed and that at least algebra and plane geometry should be included in any course.

2. The committee was quite decidedly of the opinion that history and political science should have a larger place and that we should endeavor to secure scientific teaching of these subjects. The later work should be by topics and the study should be a thorough mastery of facts, a careful analysis of the data and a clear apprehension of the underlying principles which they indicated. Of course, it is not expected that original investigation will be taken up in the high schools. The tendency to bring university methods and plans serviceable only to trained minds and experienced workers into high school work is to be avoided, but a careful study of recognized authorities, the cultivation of habits of keen discrimination, the understanding of fundamental principles and a fairly comprehensive survey of the practical side of history and political science is within the reach of any good high school and should be considered.

3. It seemed wise to make liberal provision for English, and for English and American Literature. The reasons will be obvious. In place of eight or nine required works in English Classics which are usually prescribed, it was thought best to set down a list of fifty or one hundred suitable works, from which the required number might be selected. This would leave room for the individuality of the teacher. It was conceded that those authors would be best taught which appealed most powerfully to the individual teacher and her pupils.

4. That Science should have a proper place and be treated as indicated under general principle "3."

5. Latin should have a conspicuous place. The School Review for June, 1897, tabulates the replies given by 416 high school men as to whether Latin should be taught in the high school and a great majority say unequivocally "yes." The following considerations influenced your committee:

(a) Latin affords one of the best opportunities for that continued and exacting discipline which is one of the greatest benefits derived from an education.

(b) Prudential reasons suggest its wisdom. It is comparatively easy to secure efficient teachers of Latin; the committee of ten strongly recommends it; the required equipment is small and inexpensive; and it is a general requirement for entrance to all colleges east and west.

(c) It is the best basis for English. All agreed that much more efficient work should be done in English, and Latin was one of the most powerful aids to a complete mastery of the mother tongue. Where a teacher makes the instruction in Latin a menace to the cultivation of a good English style, he or she should be dismissed at once. There will be little need for "word analysis" which occupies so conspicuous a place in some courses, if Latin be properly taught, and especially if German be added to the Latin.

(d) We are living in a scientific age. The scientific spirit seeks for sources and urges us back to foundations and fundamentals. Latin, German and Anglo-Saxon are the sources of our English speech. Among these, Latin is conspicuous and hence a scientific knowledge of English requires a proper study of Latin.

After mature deliberation upon all the points involved and a careful survey of Iowa conditions, the committee agreed that the Latin requirements of the Classical Course recommended by the committee of ten of the National Educational Association could not be obtained in Iowa high schools at present. All agreed that the Latin Scientific course recommended by the committee afforded at least a satisfactory starting point for THE ONE NECESSARY COURSE for our schools. It was accordingly made the basis of the report and of the course agreed upon, and herewith presented for adoption by Iowa teachers.

This report was unanimously adopted and the committee was continued with instructions to prepare the Manual. The General Association substituted President Charles Eldred Shelton for Professor R. A. Harkness, resigned.

The next year the work of preparing this Manual was in the hands of a sub-committee consisting of J. H. T. Main, of Iowa College, and J. J. McConnell, of the State University, with Principal Lydia Hinman, of East Waterloo. They did much work and secured the first draft of papers.

At a meeting in Council Bluffs, November, 1900, at which all members of the committee were present, together with State Superintendent Barrett, arrangements were made to submit each paper to six or more public school men who had a state-wide reputation for practical knowledge in the given subject. These lists were prepared

with care; the papers were passed around, the criticisms were collected, carefully examined by the committee, and all suggestions which seemed weighty were noted. The letters thus annotated together with the original paper were turned back to the writers for revision and final preparation. These men gave uniform and courteous attention to all criticisms and an extended correspondence was carried on. The committee having in charge the Manual cannot too highly express its appreciation of the vast amount of work done, the uniform courtesy under circumstances which might have made irritation possible, and the painstaking revision made by the gentlemen who have prepared these papers. They deserve fitting recognition at the hands of the teachers of Iowa.

Upon the removal of Charles O. Denny from the state, Dean Hill M. Bell, of Des Moines, was appointed in his place.

In the work of preparing the papers, securing criticisms and revisions, much work was performed by President Seerley, of the State Normal School, President Hughes now of Ripon College, Wisconsin, Professor Main, Superintendent McConnell, Superintendent A. T. Hukill, and Principal Lydia Hinman. State Superintendent Barrett has from the first given the committee his hearty support, has been present at every meeting at which opportunity has been afforded, and the thanks of the body is hereby extended to him for his valuable suggestions, his uniform courtesy and his deep interest in the work. It is due, also, that mention should be made of Mr. H. C. Dorcas, of the Department of Pedagogy of the State University. He has been at almost every meeting of the committee from the first, has done a large volume of clerical work, made some of the most valuable suggestions, and his services are hereby acknowledged.

The final editing, printing and proof reading were committed to a committee consisting of Superintendents J. J. McConnell and A. T. Hukill, President J. H. T. Main, and the chairman.

A list of the teachers of the state who have aided the committee by suggestions, written or oral criticisms, and in various other ways, is hereby appended; space will not permit the mention of every name, but the list will indicate the range of consultation and the effort of the committee to secure the widest possible adaptability to Iowa schools. The thanks of the committee are extended to all those here mentioned and to many others whose names cannot be printed for lack of space, who have so willingly and kindly given of their time, their thought and their attention.

It is intended to keep a record of the main criticisms offered upon the work, of any valuable suggestions which may come from any quarter, with the view of publishing a revision of this book, enlarged and improved within the next two or three years. The work already done can hardly fail to be of service to a large number of schools

throughout our state if used in the same spirit in which it has been prepared.

In behalf of the Committee of Twelve,

THOMAS NICHOLSON, CHAIRMAN.

The list of persons who have rendered assistance in various ways to the work of the committee:

State Superintendent Barrett, Assistant State Superintendent A. C. Ross, H. E. Kratz, F. H. Bloodgood, E. W. Graff, F. T. Oldt, W. I. Simpson, S. H. Sheakley, A. W. Merrill, W. C. VanNess, W. A. Doron, Maurice Ricker, L. W. Begeman, Amy Boggs, W. W. Gist, Jeannette Carpenter, O. W. Weyer, J. B. Knoepffler, Mrs. Marie Riddell, L. W. Parrish, George Chandler, W. F. Chevalier, F. E. Willard, F. E. Palmer, A. R. Sale, John E. Cameron, F. M. Witter, Jennie E. Curtis, D. M. Kelly, Mae L. MacLeod, George H. Betts, Harry M. Kelly, W. F. Barr, F. L. Douglas, H. H. Freer, J. S. Gochenauer, J. P. Hugget, C. A. Fullerton, F. C. Eastman, D. S. Wright, G. E. Finch, G. H. Hanawalt, M. F. Arey, A. G. Smith, A. C. Piersel, F. C. Bolton, Charles Noble, George E. Maclean, Alice Young, and many others. Much valuable assistance has been rendered by the Faculty of the State Normal School, Cedar Falls, the Faculty of the State University at Iowa City, and the professors of Iowa College at Grinnell. The names of the writers of the papers are appended to each document.

SECONDARY EDUCATION,

BY PRESIDENT H. H. SEERLEY, LL. D. STATE NORMAL SCHOOL.

America commonly classifies the schools of her several commonwealths as elementary, secondary and higher. The historic development of the so-called American system began with the college, then came the elementary schools and finally the secondary school was created as a necessary connecting link between the elementary school and the college. The first secondary schools were not public, but private and endowed fitting schools having as their chief business the preparation of young men for higher education. The standard of the courses of study maintained by these academies was determined by the college requirements for entrance and changes were readily and easily made to suit the new or additional demands that the colleges deemed necessary for better preparation. With the growth and development of free public schools there came a common feeling among the people that it would be better to keep the boys at home during these years of attendance at the academy and at the same time the pride and ambition of communities also aided in expanding the courses of study of the elementary schools by the introduction of academic studies until the modern public high school became a fact in every enterprising, progressive town and city. The high school was a new type of a secondary school. It was not subject to the dictation of the college as the academy had been. It became an institution that was specially under the dominion of local public opinion and was directed and developed by representatives of the people selected by a majority vote at the popular election. The high school became therefore a secondary school with a broader mission than its predecessor, the academy, as it was soon attended by a large number of pupils who sought the education there obtainable for its own sake as a fitting training for practical life, rather than as simply a preparation for higher study in the colleges and universities. The opening of such secondary schools in every center

where the people were willing to tax themselves for their support has developed an educational field which for importance to public welfare and for largeness of promise as a teaching vocation has had no parallel in the educational history of the past century. The last decade has witnessed a most remarkable expansion of secondary schools. The most palatial structures that are to be found devoted to any public work have been erected, the most expensive and complete laboratories have been provided, the most modern and decided equipments have been selected, the latest ideas in ventilation and heating have been adopted; in fact, nothing is too modern or too good for these most popular institutions, while the course of study in all its phases has been modified and enlarged until almost everything taught in all sorts of schools is today offered to the children and youth who enroll and accept the free instruction and training thus granted.

THE SCOPE OF SECONDARY EDUCATION.

What may properly be included in the work of a secondary school, organized, equipped, supported and patronized as the public high school is today, is a difficult problem to outline and more difficult to limit. The people can evidently extend the work of the school to any grade they please as public educational limits depend entirely upon public opinion, decision and action, but it seems reasonable to assume that for general purposes the public high school has its limits of service in the fact that it is a connecting link between the elementary schools and higher and professional education, as well as a school fitting its pupils for the practical and business occupations of human life. It must certainly be conceded that a high school which does not through its courses of study open up the opportunity for its graduates to go on into higher education, without loss of time or effort, fails to fulfil its entire function. If it provides more than the minimum requirements for entrance of present day colleges, it is not to be assumed that it exceeds its true function, but if through doing this its managers sacrifice thoroughness and completeness, substituting a smattering of many branches for a substantial knowledge of a few essentials, such education does an irreparable injury. It will tend to disgust or discourage the children who sooner or later become conscious of lack of power in the use of the knowledge supposed to be acquired and it will also deprive them of the development and training which all true education is assumed positively to give.

THE PURPOSE OF SECONDARY EDUCATION.

Education as an organized effort always has a definite purpose. The general motive in completing a course of study is not the attainment of rank nor the honor of graduation. The sacrifices made by parents and children have a more substantial basis than the mere

gaining of diplomas and compliments. It must have as its chief object the betterment of the individual in such lines of efficiency and usefulness as can never be satisfied by the factitious nor the fanciful. It is evident that schools are to be judged more by what they actually do for the generation under their instruction than by what they advertise to do or claim to do. Their inner life has more to do with the outcome of their pupils than their plans of organization or methods of instruction. The making of men and women in thought and action is the fundamental purpose rightly assumed as the foremost duty of a good high school, whether those under its influence go to college or go at once to the activities of practical life.

THE IDEALS OF THE SECONDARY SCHOOL.

The reality that will be attained by any system of education is dependent to a large degree upon the ideals evolved and accepted. The over expansion of a course of study; the attempt to maintain a high school without sufficient teaching force or without teachers of good extensive scholarship, are results of false ideals. So with the placing of the factitious and pretentious foremost in educational work and the underestimate often put upon accuracy and thoroughness. All are the logical result of false ideals. High school education conducted by the unprepared, by the untrained, by the unschooled or by the narrow minded will always fail to produce efficiency in scholarship, largeness in skill, thoughtfulness in thinking or strength in constructive ability or executive power. The ideals of culture, of manly power, or readiness of action, of thoughtfulness, of investigation, are all essential in the kind of results that true education can and does supply. The secondary education of the present day undertakes too much with the little, hopes to accomplish too much in too short a time and believes too much in books and facilities as substitutes for personality, character and scholarship in the teachers.

FAULTS TO BE AVOIDED.

That there are faults in present-day secondary education which should be studied carefully, corrected judiciously and assisted determinedly, is certain. They are the product of several agencies. We shall enumerate a few simply to call attention to them, hoping that the people, the school boards and the teachers may jointly work out a better condition as the improvement of the schools depends upon the intelligence and interest of local authorities rather than upon law in itself.

1. Generally there are too many isolated branches or subjects in the course of study. The time given to a specific subject is too brief to really accomplish enough to profit the pupil. Yearly units of work are regarded by the best authorities to-day as the minimum time that should be accorded to any branch of study that is worth

introducing into the program of instruction. The term-unit so frequently found is actually a waste of time as such an arrangement gives no body of knowledge which contributes to educational progress in the pupils afterwards or which gives them capacity in practical affairs.

2. The study of sciences requires well equipped laboratories. Text-book study and recitations as frequently conducted may give some general knowledge, but such methods fail to accomplish the real purpose of the study of these sciences. Properly taught these branches will leave pupils capable of investigation, of careful and independent observation, and will put them in possession of the principles upon which legitimate conclusions from observed facts are reached.

3. The teachers in secondary schools need a much more extended knowledge of the branches taught than is usual, while ability and skill in handling apparatus and in giving instruction that is of the highest order is vital to success. The modern text-book has so many excellencies and contains so much method and direction for teachers that many incompetent teachers aspire to do high school work with only such pedagogical preparation as is thus gained. The authority which the modern text-book has attained in popular favor is of such a character that the patrons are satisfied, if their children seem to have a moderate knowledge of what the book contains. So far has this gone that many people accept the text-book as a fetich and believe that with its supremacy, even ignorant teachers can succeed in advancing the education of children by thus causing them to acquire knowledge. We need to learn the philosophy of the German maxim, "The teacher is the school."

4. The needs of language, history and allied studies demand that a superior library of reference and general books, specially selected to make all such studies profitable and possible, be provided in every school. Under the present system of text-book study, these important branches are made so formal, so limited in information and so technical that the personal, individual work, most essential, is omitted. The public library of the city or community cannot be a substitute for such school library. With the common extensive selection of temporary and light fiction for public libraries, there is likely to be more detriment than benefit to those pupils in school who make a large use of the public library privileges. Since this cannot be controlled nor easily managed, the good of the pupils in a high school demands that the opportunity for wide study in a school library be provided so that the school and its library may be one in interest and object.

5. Economical methods may be so seriously and extensively applied by the authorities appointed by the people to manage the school system (1) in the small salaries paid the teachers, (2) in the

few appliances granted with which to do the work, (3) in the large number and variety of branches and classes expected to be taught by an extremely limited teaching force, that the pupils enrolled enjoy a high school in name and not in fact. There are limits below which a school board cannot go in salary and get a competent and satisfactory teacher. There are possibilities in instruction that cannot be reduced unless the essential appliances are at hand. There is a common custom in too many schools to give a teacher so many classes, so many branches or so many pupils that his work is much depreciated in efficiency. There is a point where so called economy becomes reckless waste and useless extravagance.

MANUAL TRAINING.

Of the genuine benefits to be derived from Manual Training there is now no question. Owing to the concentration of our population in towns and cities children do not and cannot get the exercise and development that comes from the active life of the country. This lack of exercise must be supplied in part at least through our schools and Manual Training seems to be the most natural channel through which to give this necessary exercise and training.

In brief Manual Training does the following for the child:

1. It teaches him self-reliance, brings him in contact with real things and thus helps to awaken his reasoning powers.
2. It awakens a deep interest in school and invests dull subjects with new life.
3. It keeps boys longer in school.
4. It develops a healthy respect for labor and industry.
5. It develops thoroughness, accuracy, perseverance and honesty.

The course here outlined is suggested as a basis for Manual Training work in the public schools from the fifth grade through the high school. It is not intended that this course shall be rigidly followed, for it is readily seen that no course can be outlined that will be exactly suited to all pupils in the grades mentioned. It must be remembered that what we are after is the development of power in the pupils and the teacher must use such models as will in his judgment, best bring about this development in each individual.

FIFTH GRADE.

Mechanical drawing, consisting of instruction in use of T square, triangle and compasses and the making of working drawings of articles constructed in wood. The simplest principles of projections showing views in two planes, may be taught here.

Wood work consisting of instruction in the use of the saw, plane, file and chisel.

Make such articles as rule, pencil sharpener, fish line winder, paper file, match scratcher, flower pot stand, bread-board, etc.

SIXTH GRADE.

Continue the work in mechanical drawing, require complete shop drawing of each article constructed in wood.

Continue instruction in use of the other bench tools, using such models as sand-paper, blocks, bench-hook, coat-hanger, paper knife, weather vane, match-box, etc. Encourage original designs.

SEVENTH GRADE.

Require shop drawings. In the wood works use such models as pencil tray, mortise and tenon frame, book-rack, knife and fork box, hat and coat rack, etc.

Give instruction in care of tools and how to sharpen them.

EIGHTH GRADE.

Require shop drawings, Encourage original designs. Allow the pupil considerable latitude in the choice of models he shall make.

Suggested models, picture frame, sled, photo box, book-case, foot stool, tabourette, etc. Instruction in the decoration of models by means of chip carving, may be given here.

HIGH SCHOOL GRADES.

In the high school the mechanical drawing may be continued, and the principles of orthographic projections, shades and shadows, and machine drawing be taught. The wood work may also be continued and more difficult articles be constructed such as tables, desks, cabinets, etc. Also give advanced work in carving.

Cost of equipment: The following is given as the approximate cost of tools and equipment required:

1 double work bench, hard wood top	\$20.00
2 quick action vises	10.00
2 -24 in. rip saws	3.50
2 -22 in. cross cut saws	3.00
2 -12 in. back saws	2.00
2 adze eye hammers	90
2 -8 in. marking guages	15
2 -4 in. screw drivers	40
2 -8 in. iron smooth planes	2.25
2 -1 in. chisels	1.50
2 -½ in. chisels	1.15
2 -¼ in. chisels	1.00
2 -1 in. gouges	1.00
1 bench brush	75
2 -2 ft. rules	15
2 -8 in. try squares	50
2 sloyd knives	60
Total	\$49.20

The foregoing is the approximate cost of one double bench and equipment and answers for two pupils at a time. The above cost may be considerably reduced by using a lighter and cheaper style of bench and having only a limited number of some of the tools (such as chisels, gouges and hammers) instead of one for each pupil in class.

In addition to the above a number of tools for general use are needed such as grind-stones, oil-stones, fore planes, glue pot, files, spoke shave, brace and bits, nail sets, barrels, panel guage, clamps, block planes, pliers, steel square.

The cost of such general tools will be from \$30.00 upwards according to the completeness of the equipment.

If provision is made for giving instruction in drawing in connection with the bench work the additional cost will be about \$10.00 for a class of twenty pupils. If extra drawing tables are not provided, then, of course, the expense would be greater.

A room fitted up with ten double benches will accommodate a class of twenty, and by allowing pupils to come to the room at different periods such a room can be utilized to give instruction to some four hundred pupils.

The total cost for equipping such a room will be about as follows:

Tools for ten double benches and benches	\$492.00
General tools	30.00
Drawing tools	10.00
Total cost	\$532.00

To supply pupils with material to work with costs about forty cents per year for each pupil.

The foregoing is respectfully submitted,

C. H. BAILEY.

D. U. MCKINNEY.

S. K. STEVENSON.

REPORTS AND RECORDS.

BY MR. H. C. DORCAS, STATE UNIVERSITY.

It is just as important to gain an accurate knowledge of general and special tendencies in the educational theory and practice of a state as to gain such a knowledge of the industries and commerce of that state. Such tendencies can be discovered and made the basis of intelligent further provision for the educational needs of the state through the periodic gathering of certain data relative to general school conditions, and through a comparative study of these data. The committee, therefore, solicits the cordial co-operation of princi-

pals of high schools and city superintendents in the gathering of such information, as well as in determining what sorts of information should be gathered. Each year blanks will be furnished calling for statistics on points like the following:

I. TEACHERS.

1. The name of each teacher in the high school.
2. His *academic* preparation for high school teaching.
 - a. Number of years during which he attended a high school or academy.
 - b. A state normal school.
 - c. A college or university.
 - d. The names of all such schools which he attended.
 - e. The academic degree (or degrees) which he holds.
3. His *professional* preparation for high school teaching.
 - a. Number of years during which he carried on distinctively pedagogical studies in state normal school, college or university.
 - b. The kind of teacher's certificate he holds (or has held).
 - (1). Grade of county teacher's certificate.
 - (2). State teacher's certificate.
 - (3). State diploma.
 - (4). State certificate in special subjects.
4. The extent of his experience as a teacher.
 - a. Number of months in rural schools.
 - b. In elementary graded schools.
 - c. In high schools or academies.
 - d. As principal or superintendent.
5. Number of recitations and laboratory exercises which he conducts daily.
6. Names of the branches of study which he is teaching.
7. His monthly salary.

II. PUPILS.

1. Number enrolled in the high school.
 - a. 9th grade: Boys.....Girls.....Total.....
 - b. 10th grade: Boys.....Girls.....Total.....
 - c. 11th grade: Boys.....Girls.....Total.....
 - d. 12th grade: Boys.....Girls.....Total.....
2. Number studying in each of the five or six main groups of subjects.
 - a. Greek.
 - b. Latin.
 - c. French.
 - d. German.

- e. English and Literature.
 - f. History, Civics, etc.
 - g. Mathematics.
 - h. Science.
3. Average age of class at graduation.
 - a. Boys-----Girls-----.
 4. Number who go (directly from the high school) to higher institutions of learning within three or four years after graduation.
 - a. To colleges of letters, arts or science.
 - b. To colleges of law.
 - c. To colleges of medicine.
 - d. To colleges of dentistry.
 - e. To colleges of theology.
 - f. To state normal schools.
 - g. To higher schools of agriculture or technology.

III. MATERIAL EQUIPMENT.

1. Building.
2. Library.
3. Apparatus and supplies.
4. Text-books used.
 - a. Furnished by school?
 - b. Furnished by pupils?

RECORDS.

More and more are the colleges, universities and higher technological schools admitting students by the certificate plan. It is realized that it is difficult to determine, by means of a short period of examination on a rather wide range of subjects and in the midst of more or less strange surroundings, whether the applicant for admission is really prepared advantageously to pursue the higher courses of study. It is fairly well known that not infrequently applicants who are really well fitted for carrying on more advanced studies fail to indicate their fitness in the formal entrance examinations; and that often others, who are really poorly prepared for college work pass such entrance examinations successfully.

There is large warrant for the belief that the certificate of the high school principal, specifying the extent and character of the pupil's high school work in each of the subjects pursued by him, and specifically recommending him as capable of going forward with advanced studies, is better evidence of the pupil's preparation for college work than entrance examination papers can be.

Therefore, the making and preserving of adequate records of pupils' high school work becomes a thing of much importance. Every pupil who graduates from a high school, and even every pupil who successfully completes the work or one or more entire terms or semesters is entitled to the assurance that he can have, *at any time after he leaves the school*, a complete certified record of whatever high school work he has done, adequate for the reasonable needs of any college or school of technology which admits students by certificate. The school owes this to each pupil as much as it owes him an education.

To this end it is certainly worth while to consider carefully the following four questions:

1. What data should such records include?
2. What is the most convenient and the best form in which to arrange and preserve these data?
3. How can the danger of the loss or destruction of such records be most certainly avoided?
4. What is the most practicable means of making these records available immediately upon request, at any time within ten or more years after the pupil has left the school?

The following suggestions are given on these points, each in its turn, not because they are deemed the best that can be offered, but in the hope that better ones may be forthcoming and generally adopted:

1. The data to be included.
 - a. Name of the high school.
 - b. Name of the pupil.
 - c. Date of the issuance of the certificate.
 - d. Date of graduation or withdrawal from the school.
 - e. Age of the pupil at graduation or withdrawal.
 - f. Name of each particular branch of study pursued by the pupil.
 - g. Number of terms (or semesters) during which he pursued each branch.
 - h. Length in weeks of the term (or semester).
 - i. Number of recitations or laboratory periods per week in each branch.
 - j. Length in minutes of:
 - a. The regular recitation period.
 - b. The regular laboratory exercise.
 - k. Text-books used.
 1. Average standing in each branch of study.
 - m. A specific recommendation of the pupil as to his character, studiousness and ability to carry on college studies successfully.

2. The form in which to arrange and preserve pupil's records. Many good forms have been and may be devised, and it would be folly to specify any one of them as certainly the best. However, two general forms may be suggested, either of which should answer. In this connection it is suggested and recommended, in view of the decided tendency in Iowa high schools to divide the school year into semesters for administrative purposes, and the further decided tendency to require one half-year's work, or some multiple thereof, in each branch of study introduced into the program of studies that a credit-unit, named and defined as follows, be generally adopted in the making and reporting of pupils' high school records:

One term-hour—one study once a week during one semester (a semester being 18, 19 or 20 weeks in length).

The two general forms for making pupils' records given below are constructed in accordance with a credit-unit as defined above.

- a. A substantial book specially ruled and printed for the purpose and in such a way that each pupil's work may be recorded *as he completes* each half-year or year section of it, and so that his entire high school record, including the data mentioned above under 1, may appear *on one page*. The book should be of first class material and bound in the most substantial way. It should be worth preserving carefully, for itself as well as for the records which it contains, and should be large enough to last through several years. The form suggested is given herewith. It constitutes *one page* of the book mentioned, upon which the records of as many as *twenty* pupils can be made. All figures, letters and words appearing in script do not belong to the form, but illustrate the method of filling out the form.

(See Table I on inserted page.)

- b. Cards, or heavy sheets of paper, specially ruled and printed for the purpose and cut in such size and shape as that they can be filed in one of the several kinds of substantial card catalog cases now used in the best modern libraries. These cases should be of the most substantial construction. A form of card is here given as an illustration.

(See Table II on inserted page.)

<i>A</i>	<i>5</i>	<i>5</i>	<i>2</i>	History of Greece. Text—
<i>A</i>	<i>5</i>	<i>5</i>	<i>2</i>	History of Rome. Text—
				History of France. Text—
<i>B</i>	<i>5</i>	<i>5</i>	<i>3</i>	History of England. Text—Montgomery.
<i>A</i>	<i>5</i>	<i>5</i>	<i>3</i>	American History. Text—Channing.
<i>A</i>	<i>5</i>	<i>5</i>	<i>4</i>	Civil Government. Text—Fiske.
				Political Economy. Text—
<i>B</i>	<i>10</i>	<i>5</i>	<i>1</i>	Algebra, 1st year. Text—Wentworth.
<i>B</i>	<i>5</i>	<i>5</i>	<i>1</i>	Algebra, 2nd year. Text—Wentworth.
<i>B</i>	<i>10</i>	<i>5</i>	<i>2 & 3</i>	Plane Geometry. Text—Wentworth.
<i>C</i>	<i>5</i>	<i>5</i>	<i>3</i>	Solid Geometry. Text—Wentworth.
				Higher Arithmetic.

D.

(REVERSE

Recitation periods 40 minutes. L

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A. Year (or years) in which each branch was studied—1st, 2nd, 3rd, or 4th designated 1, 2, 3, or 4.)

1. Number of Term-Hours in each branch.
 - (a) One term-hour=one study once a week during one semester.
 - (b) One semester=18 weeks.
 - (c) Recitation periods=40 minutes.
 - (d) Laboratory periods=80 minutes.

2. Average standings. Scale.
Highest=A or 1.
Good=B or 2.
Fair=C or 3.
Passing=D or 4.

Term-hours necessary to graduation=160.

II. CARD RECORD.

(FRONT SIDE)

(REVERSE SIDE)

.....IOWA, HIGH SCHOOL. NAME, *Doe, John*. BORN WHERE, *Scranton, Penn.*

WHEN, 8-18-'83. GRADUATED OR WITHDREW, 5-31-1901. TOTAL TERM HOURS, 160. SEMESTERS, 18 WEEKS.

One Term Hour=one study once a week during one semester.

John Doe is recommended as of good moral character, studious habits and, judging from past records, able successfully to carry forward the work of the Freshman Year in College.

Recitation periods 40 minutes. Laboratory periods 80 minutes.

COURSES.	TEXTS.	GROUND COVERED.	1ST SEMESTER.		2ND SEMESTER.		YEAR.	TERM HOURS.	COURSES.	TEXTS.	GROUND COVERED.	1ST SEMESTER.		2ND SEMESTER.		YEAR.	TERM HOURS.	
Latin, 1st year, 10.....	Collar & Daniell.....	Entire book.....	85	5	90	5	'99	10	Algebra, 10.....	Ray (Arith.).....	Entire book.....	98	5			'01	5	
Vir. Rom.; Caesar 2 books; prose, 10									Algebra ^s , Plane Geometry ^s , 10.....									
Cicero, 6 orations, prose, 10.....									Plane Geometry ^s , Solid Geometry ^s , 10.....									
Vergil, 6 books, 10.....									Higher Arithmetic ^s , Trigonometry ^s , 10.....									
German, 1st year, 10.....	Lockwood.....	Pages 1 to 175.....							Physics, 10.....	Gray, S. & F. Book.....	Entire book.....			83	5	'99	5	
German, Classics, 2nd year, 10.....									Botany, 5.....									
English Composition; Classics, 10.....									Physical Geography, 5.....									
Rhetoric; Classics, 2nd year, 10.....									Physiology, 5.....			Remsen.....	Entire book.....		80	5	'01	5
Eng. and Amer. Literature, 3rd year, 10.....									Chemistry, 5.....									
History of Literature, 4th year, 5.....									Zoology, 5.....									
English Grammar, 4th year, 5.....																	85	5
General History, 10.....			Channing.....	Entire book.....			95	5	'01			5	Book-keeping, Double Entry, 5.....	Ellis.....	Entire book.....			
English History, 3rd year, 5.....									Drawing (special teacher), 5.....									
American History, 3rd year, 5.....									Commercial Arithmetic, 5.....									
Civil Government, 4th year, 5.....									Commercial Geography, 5.....									
Political Economy, 4th year, 5.....									Commercial Law, 5.....									
								Type Writing, 5.....										

Signed: J. M. PLANK, Superintendent or Principal.

Signed: J. M. BLANK, Superintendent or Principal.

Its dimensions are $3\frac{3}{4}$ by 6 inches and it is ruled and printed on both sides. It may be cut conformably to any one of the several styles of locking apparatus. The one here given has a round hole in the bottom through which passes the rod that locks it in its place in the drawer. Upon this card may be given the entire high school record of each pupil, including all of the data mentioned above under 1. As each half year's work is completed the record may be permanently entered on the card. All figures, letters and words in *italics* are not a part of the form, but merely illustrate the method of filling out the form. The figures immediately to the right of the names of the branches of study indicate the number of term hours of work in each of these branches as called for in the course of study. For example, algebra is studied daily throughout the two semesters of the first year—10 term hours; and in the second year, daily through *one* semester—5 term hours, while plane geometry follows daily during the second semester—5 term hours. The figures in the left of the two double columns headed 1st Sem. and 2nd Sem. respectively, indicate the average semester standing in each branch; while the figures in the right of these columns indicate the numbers of term hours made *by this pupil*. The figures in the column headed "year" indicate the calendar years in which this pupil studied each branch, and the figures in the last column under "term Hrs." show the total number of term hours made by this pupil in each branch.

Each school maintaining several courses or groups of study could have these cards printed in sets—one for pupils pursuing the classical course, another for pupils pursuing the scientific course, etc., and in this way avoid the necessity of printing the names of *all* proper high school subjects on *all* the cards.

A copy of this card can be given to the pupil at the time he graduates. It should answer the purposes of any college or school of technology which admits students on the certificate plan, and will be accepted by all of the colleges of the College Department of the Iowa State Teachers' Association. If a pupil should lose his card at any time he could have a duplicate made—at the actual expense involved, if that should be deemed wise—from the original which would be filed away in the card catalog case, alphabetically with the cards of the other members of the class.

It is suggested that the original cards be of good and

rather heavy card-board; but that all copies, for distribution to the pupils be of heavy paper of such texture that they could be easily folded without breaking.

Uniform blanks for reporting pupils' high school credits to any of the colleges of the College Department of the Iowa State Teachers' Association may be obtained at any time by writing to the President of any one of these colleges.

3. How guard against the danger of loss or destruction by fire, of these records?

This is a question to be very carefully considered by school superintendents and boards of education. They should take the same care and be at the same expense to provide a fire-proof receptacle in which to preserve pupils' records, and should realize the same responsibility for the proper making and preserving of such records, as would be expected in the case of the records in the offices of the county clerk, county recorder or county treasurer. The pupils are entitled to copies of these records at any time on any working day in any year after they leave school, as long as there is any possibility of their needing them.

School boards are therefore earnestly urged to provide either a suitable *record book* specially ruled and printed, made of the best material and most substantially bound; or suitable cards, specially printed and ruled and made of the best card-board, and an ample, substantially built card case with one of the most approved locking devices, in which to file them; and finally a fire proof receptacle in which to keep them safe from loss or destruction.

4. How to make these records immediately available upon request.

Over and over again it has happened that pupils could not secure a certified copy of their high school records when they most needed it simply because the only person who could gain access to them was not within reach. The most practical suggestion that occurs to us is that of giving to each pupil at his graduation a duplicate of his permanent record card, and in this way lessen, as much as possible, the number of those who at inopportune times would want certified copies of their records. In addition to this, one of the school officers, who will be most likely to be in town during the absence of the superintendent, should have access to the receptacle in which the records and record blanks are kept. This school officer should carefully guard the records in his keeping and should always be ready to supply any pupil requesting it, a copy of his record.

Finally, the committee suggests and recommends that when-

ever an accredited high school receives pupils with advanced standing, whether these pupils come from other accredited schools or not, the principal *specify particularly* in the pupil's permanent record or on his permanent record card just *what credits* he accepts from that other school, exactly as he would if recording credits regularly earned in his own school; and that he indicate clearly the name of the school from which such credits are accepted.

Similarly, whenever any pupil, either in his own school, or coming from another school, secures credit *by merely passing examinations*, and without the regular daily exercises of the class, the principal should indicate clearly the manner in which the credit was secured, designating at the same time the *amount* of work for which the credit is given, in the usual way.

IMPORTANT EDUCATIONAL DOCUMENTS.

PREPARED BY THE COMMITTEE.

The committee calls attention to some documents of great value to high school principals and to school boards which should be subjects of ready reference.

The first of these is the report of the committee on secondary school studies, appointed at the meeting of the National Educational Association in 1892, popularly known as the Report of the Committee of Ten. It was issued from the government printing office in 1893. For the convenience of those who may not have the document or who may not have time to make a careful study of it, we here-with insert two of the four courses of study there outlined, with the paragraphs which immediately precede and follow the same. The course outlined by our own committee was originally based upon the latin-scientific course of this committee of ten, modified to meet what seemed the needs of Iowa schools.

This report says: "The most striking differences in the four programmes will be found, as is intimated in the headings, in the relative amounts of time given to foreign languages. In the classical programme the foreign languages get a large share of time; in the English programme a small share. In compensation, English and history are more developed in the English programme than in the classical.

"Many teachers will say, at first sight, that physics comes too early in these programmes and Greek too late. One member of the committee is firmly of the opinion that Greek comes too late. The explanation of the positions assigned to these subjects is that the committee of ten attached great importance to two general principles in programme making:—In the first place they endeavored to

postpone till the third year the grave choice between the classical course and the latin-scientific. They believed that this bifurcation should occur as late as possible, since the choice between these two roads often determines for life the youth's career. Moreover, they believed that it is possible to make this important decision for a boy on good grounds, only when he has had opportunity to exhibit his quality and discover his tastes by making excursions into all the principal fields of knowledge. The youth who has never studied any but his native language cannot know his own capacity for linguistic acquisition; and the youth who has never made a chemical or physical experiment cannot know whether or not he has a taste for exact science.



TABLE IV.

YEAR	CLASSICAL LANGUAGES. THREE FOREIGN. (ONE MODERN.)	LATIN-SCIENTIFIC. TWO FOREIGN LANGUAGES (ONE MOD.)
I.	Latin..... 5 p. English..... 4 p. Algebra..... 4 p. History..... 4 p. Physical Geography..... 3 p. 20 p.	Latin..... 5 p. English..... 4 p. Algebra..... 4 p. History..... 4 p. Physical Geography..... 3 p. 20 p.
II.	Latin..... 5 p. English..... 2 p. *German (<i>or</i> French) begun..... 4 p. Geometry..... 3 p. Physics..... 3 p. History..... 3 p. 20 p.	Latin..... 5 p. English..... 2 p. German (<i>or</i> French) begun..... 4 p. Geometry..... 3 p. Physics..... 3 p. Botany or Zoology..... 3 p. 20 p.
III.	Latin..... 4 p. *Greek..... 5 p. English..... 3 p. German (<i>or</i> French)..... 4 p. Mathematics (Algebra 2) (Geometry 2)..... 4 p. 20 p.	Latin..... 4 p. English..... 3 p. German (<i>or</i> French)..... 4 p. Mathematics (Algebra 2) (Geometry 2)..... 4 p. Astronomy $\frac{1}{2}$ yr. and Meteorology $\frac{1}{2}$ yr..... 3 p. History..... 2 p. 20 p.
IV.	Latin..... 4 p. Greek..... 5 p. English..... 2 p. German (<i>or</i> French)..... 3 p. Chemistry..... 3 p. Trigonometry and Higher Arithmetic <i>or</i> Hist.. 3 p. 20 p.	Latin..... 4 p. English (as in Classical 2) (additional 2)..... 4 p. German (<i>or</i> French)..... 3 p. Chemistry..... 3 p. Trigonometry and Higher Arithmetic <i>or</i> History..... 3 p. Geology or Physiography $\frac{1}{2}$ yr. and Anatomy, Physiology and Hygiene $\frac{1}{2}$ yr..... 3 p. 20 p.

*In any school in which Greek can be better taught than a modern language, or in which local public opinion or the history of the school makes it desirable to teach Greek in an ample way, Greek may be substituted for German or French in the second year of the classical programme.

“The wisest teacher or the most observant parent, can hardly predict with confidence a boy’s gift for a subject which he has never touched. In these considerations the committee found strong rea-

sons for postponing bifurcation, and making the subjects of the first two years as truly representative as possible. Secondly, inasmuch as many boys and girls who begin the secondary school course do not stay in school more than two years, the committee thought it important to select the studies of the first two years in such a way that linguistic, historical, mathematical and scientific studies should all be properly represented. Natural history being presented by physical geography, the committee wished physics to represent the inorganic sciences of precision. The first two years of any one of the four programmes presented above will, in the judgment of the committee, be highly profitable by themselves to children who go no farther.

"In the construction of the sample programmes the committee adopted twenty as the maximum number of weekly periods, but with two qualifications, namely, that at least five of the twenty periods should be given to unprepared work, and that laboratory subjects should have double periods whenever the prolongation should be possible.

"The omission of music, drawing and elocution from the programmes offered by the committee was not intended to imply that these subjects ought to receive no systematic attention. It was merely thought best to leave it to local school authorities to determine, without suggestions from the committee, how these subjects should be introduced into the programmes in addition to the subjects reported on by the conferences."

OTHER IMPORTANT DOCUMENTS ARE:

The report of the committee on college entrance requirements, made before the National Educational Association, Los Angeles, California, July, 1899. This may be read in the published proceedings of that body for the year 1899, page 632 et seq. It has also been published separately under the title "Report of Committee on College Entrance Requirements, July, 1899." (The University of Chicago Press). In addition to the said report, Part II, of this publication contains the report of the committee of twelve of the American Philological Association on courses in Latin and Greek in secondary schools; the report of the committee of twelve on the Modern Language Association of America; the report of the committee of seven on the American Historical Association; the report of the Chicago section of the American Mathematical Society; and numerous valuable scientific reports.

Consult also a valuable report under the title of "Department of Secondary Education" in the proceedings of the National Educational Association in 1898, page 664 et seq. Special attention is there given to English.

Much valuable information may be had from the annual reports of the National Educational Association, year by year. They may be secured through Mr. Irwin Shepard, Secretary N. E. A., Winona, Minn.

Part II.

HIGH SCHOOL COURSE OF STUDY.

Adopted by the Iowa State Teachers' Association, Dec. 29, 1899.

FIRST YEAR.

Latin	5
Algebra	5
English	4
History (Ancient history preferred).....	5

SECOND YEAR.

Latin	5
Algebra for first half of year.....	4
Concrete Geometry (Option B) half year.....	4
English	3
History (Modern or advanced United States).....	3
Science (From Group A).....	4

THIRD YEAR.

Latin	5
Plane Geometry	5
English	3
French, German or Greek (Option A).....	5

FOURTH YEAR.

Latin	4
English	3
Physics	4
Political Economy , one-half year.....	3
Civics , one-half year.....	3
French, German or Greek (Option B).....	5

NOTE. Subjects printed in heavy faced type are constant; those in ordinary type admit of option--that is, the subjects noted below may be taken instead of those in the light faced type, with full and equivalent credit.

OPTIONS.

Group A—SCIENCE.

SECOND YEAR OF COURSE.—Botany throughout the year preferred; Zoology throughout the year, second choice. A half year of either of these subjects with second half of the year given to Physiography or Physiology or Geology or Astronomy will be accepted, but the one continuous study is decidedly preferred.

THIRD YEAR OF COURSE.—Instead of French, German or Greek, one full year of Botany, Zoology or Chemistry; provided, it has not been selected in second year.

Group B—MATHEMATICS.

SECOND YEAR OF COURSE.—Instead of Concrete Geometry, Advanced Arithmetic or Book-keeping may be taken.

FOURTH YEAR OF COURSE.—Instead of French, German or Greek, one-half year of Solid Geometry and one-half year of Trigonometry may be taken.

The course contemplates nineteen recitations per week. Music, Free-Hand Drawing or Manual Training may be pursued in addition to these if desired; otherwise there should not be more than twenty recitations of thirty to thirty-five minutes each per week.

BOTANY.

To lay out a course in any science, as botany, is a problem surrounded with difficulties by no means small. The subject is so large, so many sided that the methods of approach are of necessity diverse. Professors of the science are in this particular by no means agreed, and almost every prominent teacher of the subject has a method of his own. Text-books in elementary botany are many and varied; nearly all good, each in its way, and in its own field; so that it is hardly to be hoped, much less expected, that what may be said here will meet with such general approval as might be accorded, for instance, to a similar outline in arithmetic or German. Furthermore, the method of presenting the subject must be, ought to be, determined very largely by local conditions, not only of the teaching force, but of natural surroundings. Botany by the Mississippi river, for example, might be one thing; in a prairie village, quite another.

Again, we must always have regard to the end in view. This is primarily the practical advantage of the pupil, his information and instruction as a possible citizen, and the botany we give him should have respect to this particular thing. This being admitted, it seems plain that any presentation of the science which leaves the pupil ignorant of his own environment and of his relations to the common plants about him, fails in just so far of the purpose for which botanic studies are offered in the public schools.

Once more: the character of the work attempted must in some measure depend upon the time which may be devoted to the subject. The committee, however, has not had in mind in any case a course of more than one year.

Your committee is agreed that elementary botany should be largely that which is called structural; at no point should the life-relations of the plant be considered apart from the structure. Elementary botany should deal at first chiefly with the gross anatomy and make-up of our familiar plants, especially the common plants of the locality in question. The pupil should be taught to observe; his lessons to the very largest extent possible, should be out of doors. He should learn the characteristics of various sorts of plants, their habits and the conditions under which they flourish. In doing this he should be taught to observe plants at all seasons and in all phases. The second half of the school year, as now constituted, affords opportunity for doing this, as we have winter, spring and summer conditions, all within the period named. The pupils must never be taught simply words and their definitions; this is the fault of certain otherwise excellent text-books. On the other hand the pupil should acquire his vocabulary naturally, that is, as he needs it. By taking up the study of plants where they are and as they are, by cultivating plants indoors, in sand, by all inexpensive ways, the pupils will gradually come into possession, not only of the leading facts as to the structure or make-up of the ordinary flowering plant, but will learn its principal activities as well. Some of our trees, fortunately some of the most common, afford excellent subjects for elementary botany study; they stand leafless with the sleep of winter, they break into bloom, they put forth their leaves, they grow in height, in thickness, they form their fruit, the fruit germinates and forms a new plant all within the time limit as here supposed.

In addition to such simple work as this, some simple flowering plant may be studied when the time of flowering comes—a Trillium, a Ranunculus; this to show to better advantage the perfection flowers attain in matters of color, size, odor, and their relations to the insect world. In any event, whatever plants are studied, others of the same natural order should be presented at the same time, or as soon thereafter as possible, in order that the pupil obtain some conception of the relationships of plants to each other, their natural

kinship, and the signs by which such kinship may be discovered or confirmed. The same principle obtains, of course, for the cryptogamic world, if the teacher elect to begin investigations there.

Not only may plants be thus studied in groups as related to each other, but they should, where opportunity offers, be studied as grouped in the field. Find out every plant growing spontaneously in the same grove or thicket, for example. It will now be necessary to name the plants in some way. The two volumes last named in the appended list are lexicons for the purpose we have now in view. In this way it will presently appear that members of various natural orders are often more closely associated in the field than are the most closely related members of any one order, etc., etc.

The utility of plants should be made a matter of investigation. Those that furnish food should be recognized and listed; those that furnish fuel, lumber, shelter; food for domestic animals; protection for the soil against water or wind; protection of water supply, as the rivulet or spring, the lake shore; those that are useful for ornament to adorn our homes and farms.

Such in general is the ground which, in the judgment of your committee, should be covered by one who assays to teach the science of botany in our public schools. We believe the work practicable, and we mean it to be practical. The course can be indefinitely extended. In schools fitted up with laboratories, microscopes, etc., as all our high schools eventually must be, the cellular anatomy and physiology of plants may be presented; plant diseases may become a matter of investigation, but in no case should such work be allowed to supercede that already outlined. If an entire year can be given to the subject so much the better; even in the non-growing season the investigation of the winter condition of buds and stems, the study of germinating the seeds and microscopic investigation of alcoholic material will afford ample opportunity for profitable work. The spring and summer may then be given to acquiring a more perfect acquaintance with the flora of the locality, both phenogamic and cryptogamic, and to the investigation of such problems in plant physiology, distribution, habit, as the immediate region may suggest.

In view of the multitude of excellent texts on this particular subject your committee prefers not to recommend any. A good teacher should have on the table copies of all. The following list contains the names of the more prominent recent text-books on botany:

Arthur, Barnes and Coulter, *Plant Dissection*; Atkinson, *Elementary Botany*; Bailey, *Lessons with Plants*; Barnes, *Outlines of Plant Life*; Bergen, *Elementary Botany*; Bessey, *Essentials of Botany*; Coulter, *Plant Relations*; Coulter, *Plant Structures*; Darwin, *Elements of Botany*; Ganong, *The Teaching Botanist*; Geddes, *Chapters in Modern Botany*; Gray, *School and Field-Book*; Mac-

bride, *Elementary Lessons in Botany*; Spalding, *Introduction to Botany*; Strasburger and Hillhouse, *Practical Botany*; Vines, *Student's Text-Book of Botany*; Gray's *Manual of the Botany of the Northern United States*; Britton's *Manual of the Flora of the Northern States and Canada*; Strasburger, Noel & Schenck, and Slimper, *Text-Book of Botany*, English translation by H. C. Porter.

T. H. MACBRIDE,

L. H. PAMMEL.

Perhaps no paper submitted was more extendedly or severely criticised than the above outline for botany. Great care has been taken by the committee in the revision. Both Professor Macbride and Professor Pammel went carefully over the entire list of criticisms and made revisions in accordance therewith. The following paragraphs from the letter of Professor Pammel following his revision of the paper are so suggestive that they are herewith presented. He says:

"The criticisms are, I think, on the whole very good, but to some I must take exceptions. I have done some work along ecological lines. The present status of the subject is such that this matter will have to be taught in a very guarded way. The whole nomenclature of this subject will need revision. If the nomenclature of some of the authors is used the subject is so complex that a high school student will not get much out of it.

"Certain fundamental facts can be learned by the student. Bailey's *Lessons with Plants*, and Bergen's *Botany* present the subject in an admirable manner. I think Macbride's book is a most excellent one, not only because of its literary excellence, but for the subject matter. As to Dr. Gray's *Lessons and Manual*, they need no defense. Dr. Gray's *Lessons* is the best American text-book that has ever been written on the subject of structural botany of flowering plants, notwithstanding the criticism of some. The teacher who cannot adapt himself to the needs of our schools should not teach botany.

"I think the great trouble with high schools is that they offer too much work for the time given. I have had high school scholars who were not able to tell me what the simple terms in descriptive botany meant.

"After all, for what do we study botany in high schools or colleges?

1. The utilitarian idea.
2. To train our powers of observation.
3. That we may derive some pleasure from the study of plants after our course in the high school or college is completed.

"Very few of the scholars of a high school or students in college will become botanists. The second object of the study of plants is most important. No other science is so valuable to train the powers of observation as botany, for the reason that the material may be

had readily. I believe that in structural botany material should be more freely used than it is. It is a mistake to have the student earn long names without laboratory material.

"As to the third object; this is important for the person who will engage in business or the professions. It will give the man or woman added pleasure to know what a plant is and how to trace it out. By knowing plants they mean more to him. Structural and systematic botany should be taught in every high school. I am old fashioned enough to believe in this system.

"Physiological botany is important, and the fundamental facts ought to be given, but the high school student will not have the time to go into this subject very far. This applies also to a study of fungi, algæ, and lichens."

L. H. PAMMEL.

CIVICS.—I.

Among the many signs of improvement in high school courses is the increasing interest in those branches which are calculated to add intelligence to the patriotism of our young Americans. It is not enough for the safety of a nation that her citizens shall, in their public school training, have become acquainted with the natural sciences, mathematics and the ancient languages, or even with English and American literature. Such preparation is good so far as it goes, but specific and somewhat extended instruction in government as it has been, is, and as it ought to be, is essential to a wise use of the prerogatives of citizenship, if the municipal, state and national reforms so loudly demanded are ever to be brought about. Accurate economic knowledge is also necessary if our future legislators are to give us laws that shall aid in improving the relations of employers and labor, of trusts and the public rights, or of foreign trade and home industries.

The time given to these studies should be extended even beyond the recommendations of the committee, and certainly the demands of no other branch should be allowed to encroach on the meager year allowed in the proposed course to civics and economics. We all know that the first term in any branch of study merely gives an introduction, and that the valuable work comes through further study after a foundation has been laid and interest awakened. The idea of completing United States and Iowa governments in one term of high school work should not be for a moment entertained. Two terms is the *very least* time that should be given to these studies, and if Iowa civic history is to be included, a year's time for civics is little enough. As to economics—any of the excellent texts written for high school classes, e. g. Walker, Laughlin, MacVane, Davenport call for at least two terms of work. Other and lighter works are either too light or not up-to date. Even the simpler and more funda-

mental principles of economics need considerable discussion, illustration and application before they can be of real use in the study of the questions of the day, or the intelligent reading of reliable magazine articles upon these subjects. An intelligent grasp of normal price, marginal utility, the Ricardian theory of rent, the principles underlying the money question, is not to be secured by a swift and good natured reading of any of these texts. They must be *studied*, and every point discussed, disputed and mastered. If two terms cannot be allowed to this study, then fewer topics should be undertaken. That phase of United States and English history which bears upon the evolution of government, trade and the industries should be emphasized, and dull indeed must be the teacher who cannot interest his classes in these subjects. The mastery of fundamental principles and definitions, followed by the freest discussion, with full encouragement of differences of opinion, will make larger interest and more accurate thinking, and lead to study of current events in the newspapers, and a general intelligence, where we now find utter apathy and astonishing ignorance.

Every high school should have "a class-of-the-whole" for discussing current events every day in the year. The lack of such work in the high school should be a mark of a back number. Debates, essays and orations on the stirring events of the day should constitute an interesting and profitable portion of whatever rhetorical occurs in the high school programs. The reading and discussion of such books as "The Workers," "East" and "West," and other reliable books in story form, describing the economic and civic conditions of our day, and, for that matter, of the past, may well be encouraged and even directed by the teacher of civics. In short while teachers in other departments of high school work are doing so much to increase interest in their classes, the teachers of civics and economics must show equal earnestness and devotion, and use equal skill in creating enthusiasm in these branches so essential to the education of a citizen in a modern republic.

L. W. PARRISH.

CIVICS.—II.

The importance of civics or civil government in the schools depends upon our view of the purposes of education in general and of political education in particular. If the chief purpose of public education is to elevate the public standards of citizenship and right living, and if the purpose of political education is to familiarize the people with the forms and processes through which they may participate in public affairs, then there can no longer be any doubt of the place of civics in our schools.

Nor should this subject be left for the college and university curriculum. It should be taught in all high schools; and in connection with history, geography and literature it may be presented in

grades below the high school. In the broadest sense of exalting citizenship, suggesting ideals of conduct, and inspiring a love for public service, civil government has a place in every school, college and university in the land. But it is the inspiration of high standards of citizenship and right living rather than the acquisition of knowledge concerning the forms and powers of government that makes the study of civics and politics worth the while. The success with which it is taught will depend largely upon the purpose and character of the teacher.

There is no one right way of teaching a subject like civics. Each teacher must, to a very considerable extent, be his own guide and follow his own methods. To follow the program of another and rely wholly upon text-books is to assume the role of a task master. Nevertheless, texts will assist and suggestions may inspire. Herein a few suggestions are ventured.

In the first place, an attempt should be made to bring the pupils to a realization of their citizenship. They should be filled with the idea that they are not independent, isolated individuals, but members of a larger whole—the family, the community, the city, the country, the state, the nation. Then they should be made to see that the government—local, state and national—under which they live is simply the organization of the people; that the form and administration of this government is determined by the people acting as citizens; that the character of the people will be the measure of the standards of the government; and that it is the duty of all to participate in the administration of government, to the extent, at least, of helping to create a sound public opinion. In short, the facts relating to the form and organization of government gathered from code, statutes, constitutions and text-books should be spiritualized by such ideas as these.

And the teacher himself must realize that he is assisting in the preparation of boys and girls, young men and young women, for intelligent, useful and active citizenship. He must teach civics ever conscious of the fact that the highest aim of political education is to prepare the youth for citizenship by putting the emphasis on character, and by inspiring ideals of courage, progress, loftiness of purpose, sympathy, unselfishness, and public generosity.

As intimated above, it would, perhaps, be unwise to attempt a systematic course in civics in any of the grades below the high school. And yet pupils in the grammar grades may be somewhat informed concerning the government under which they live through the courses in geography and history. They may also be led to seize upon many ideals of public service and patriotic conduct through a study of the lives of great citizens and statesmen. Of course it cannot be expected that pupils in these grades will read widely in the literature of American statesmanship; but the nobler

traits and aspirations of great citizens like Washington, Jefferson, Madison, Lincoln, Greeley and Kirkwood, can easily be set forth by the teacher in language easily comprehended by a child of 8 or 10 years. To get children to reverence and cherish the ideals in the lives of these great men will be of far more value than to force them to commit to memory lists of township, county and state officers. For, after all, the aim of political education, whether in the college, university or secondary schools, is the formation of character through the adoption of ideals.

In the eleventh or twelfth grades of the high school a systematic course in civics may be prescribed. Here a text may be used. The pupils should in a very general way be familiarized with the form, organization and workings of the local, state and national government under which they live.

The facts relative to the form and organization of the government may be gathered from text-books, the constitution and the code. But such facts should be supplemented by talks of the rights, duties, privileges, and obligations of citizenship. Comparisons with foreign governments may be introduced with good results.

It is, of course, more difficult to make clear the workings of government. However, something in this direction may be gained through mock-conventions, mock-elections, mock-assemblies, mock-caucuses, mock-congresses and the like. Where practicable the pupils should be encouraged to visit the courts, the city or village councils, and the state legislature.

The first work in civics in the high school will very naturally be given in connection with and as a part of history and geography. The history taught should be local history and state history. The geography taught should be the geography of the township, county, city and state. Thus local politics may be studied in connection with local geography and local history.

B. F. SHAMBAUGH.

ECONOMICS.

The place in the course of the high school which economics has so far made for itself in Iowa high schools is that of a single term-study of from twelve to eighteen weeks in the last year, or in the year preceding the last year of the prescribed course of study. If the writer is not mistaken with regard to what he considers the present place of economics in the usual high school course, he will venture to express the opinion that economics has now about the place and nearly all the time which can be accorded it by the side of the other subjects. It may be useful, however, that in all cases where the study of economics is formally undertaken it

should have fully one-half of the school year, to be followed or preceded by a good high school course in the elements of civil government or United States History.

Something may be said with regard to the preparation that is made for the study of economics in and throughout the work of the lower grades and during the first year or two of the high school. Teachers do, perhaps, not see with sufficient clearness the amount of preparation for the study of economics that may be made through the curriculum of the grades and the first two years of the high school.

Four studies expressly, and incidentally a fifth, prepare the way for the teaching of economics. These are: arithmetic, geography, history and civil government. The fifth is reading, if it may be treated separately. All of these bear upon the study of economics, and with the improved methods of teaching these subjects as actual branches of knowledge concerning the world in which we live, methods which have been making their way into our schools, the high school pupil in his third or fourth year should be prepared to take up economics as it is presented in such a text as that of Professor Laughlin or that of the late President Walker.

To point the relation of the preliminary studies more clearly, and in one of the most neglected fields, attention is called to the opportunities which the teacher of arithmetic and the teacher of bookkeeping have to give their pupils information of detail regarding the course of commerce and the usages of business in modern countries. Such a text in higher arithmetic as that of Beeman and Smith, for example, would furnish an admirable opportunity for excellent collateral work by a high school class that is pursuing or about to pursue a course of study in theoretical economics as expounded in our standard text-books. Physical geography and political geography may each in their own way contribute their portion of object matter toward furnishing a concrete basis for the discussion of domestic as well as international trade.

In the history class long before you come to the formal study of economics there are many opportunities of enforcing the teachings of economic science by evils which follow from a neglect of those teachings, e. g. the evils of a disordered currency, as experienced in the Revolutionary War, or the dangers of irresponsible banking as illustrated by disorders in the currency connected with our wild-cat banking in the south-west and west during the thirties and forties of the present century.

In the class in civil government the occasion for having government at all may be studied and the advantages of law and order in their reaction upon the economic welfare of the people may be pointed out at length.

One chief obstacle to the successful teaching of economics in

the high school lies in the fact that the boys and girls in our high schools have hardly a sufficient data of experience to enable them to comprehend or appreciate the broad generalizations which are customarily made in economic science. Therefore, the more active and intelligent the efforts of teachers in the grades and co-ordinate studies in the high school itself are, to furnish the mind with objective content, real knowledge of the actual works in its business life and laws, in so far as knowledge of these can be communicated to the youth in the school room from day to day, the more probably will a high school class profit by a course in economics.

The importance, or perhaps rather the possibilities, of such subjects as commercial arithmetic and bookkeeping can only be appreciated by the teacher who is himself a wide-awake citizen, thoroughly informed and appreciative of these subjects as they reach into the very life of our busy every-day world. Good teaching along these lines, supported by a correct ethical purpose, is of great importance toward preventing poor teaching and yet poorer learning when the pupils come to the abstractions of economic science.

One word now on the teaching of economics itself. The writer has no hesitation in saying that if the supplementary and preparatory work which he has sketched could be well done, he would prefer to see economics as such moved into the college and university curriculum, because the dangers of a superficial study of a difficult subject are always considerable.

It is perhaps not necessary to go further from the shore than wading depth, and the precaution to keep on bottom that can be fathomed may be wisely urged. To this end the text book should always be well selected. In economics the text-book should be strong, clear and classical. The two texts above referred to are good examples of their kind; and there are a few other good texts for high school classes. That of Bullock may be named.

We shall by and by have books which deal with economic science in a more descriptive manner, though equally scientific. Henry W. Thurston's *Economics and Industrial History* (Chicago, 1899) is a good example of this new type of text-book, but it requires a well prepared teacher to use it. A good text-book should be calculated to furnish knowledge, and develop lines of reasoning suitable to the age of the pupils. Where descriptive work can be supplied by the teacher, who is however seldom prepared to furnish it, the high school class has a great advantage.

ISAAC A. LOOS.

COMPOSITION AND RHETORIC.

I. THINGS TO BE ACCOMPLISHED.

1. The pupil should be made to acquire the ability to write English that shall not bear the mark of illiteracy.
2. He must be given enough sense of style to enable him to vary his own writing to make it conform in some measure to the subject he has in mind.
3. He must be taught rhetorical doctrine, but only in connection with his own exemplification of it in his own writing; he must be trained in literary judgment, rather than informed in regard to literary laws.
4. To accomplish this he must be kept busy writing until by the criticism of his own errors he has learned to avoid them.
5. After he has come to a knowledge of what constitutes correctness in English he should be given training in the qualities that distinguish literature from other writing.

II. ORDER OF TREATMENT.

1. The initial difficulty is that of getting pupils to write.
2. That this difficulty may be lessened the work should first take up the whole theme and the paragraph. The pupil should be directed in securing material from experience, from observation, and from books; and in this fashion his interest in the problem of having something to say should be quickened.
3. At first criticism of what he writes should not go beyond the question of choice and arrangement of material, except in the case of elementary grammatical errors.
4. From the paragraph work should proceed to consideration of the sentence words and questions of style.

III. METHOD OF TEACHING.

1. In the teaching of English in the high school a suitable text is very necessary. Principles of literary composition are too vague for the pupil to be able to hold them in mind without having opportunity to think them over from the printed page.
2. The study of the text, however, should be made subordinate to the writing of themes, and in this the student should be given some range of choice in the matter of subjects.
3. Occasionally all members of the class should be compelled to write on the same subject and comparison between the different compositions made.

4. All criticisms of themes should be made as definite as possible and should give reasons which the pupil will accept without the assurance of some rhetorical authority.
5. These corrections should often be read to the class as a subject for class discussion, and as often as possible the teacher should find time to go over the themes with the pupil alone taking pains to reach the pupil's characteristic faults.
6. It will be found helpful to ask for written outlines of subjects often and these should be criticised for coherence, arrangement and proportion.
7. The class should be given some drill in criticising compositions themselves.

IV. RHETORIC AND LITERATURE.

1. The study of literature may profitably be taken up in connection with the work in composition, the classes reciting on alternate days. Themes may then be assigned from the work in the literature class, but these themes should not demand of the pupil any critical thinking beyond what has been done in the class. In the work in composition the pupil must devote himself largely to expressing what he already has in mind.
2. Care must be taken not to repress the individuality of the pupil by making him feel that he must follow some author whom he is studying as a model.
3. While facility in expression is the end of the work, the pupil's inventive faculties must be stimulated or he will not care to write or have occasion for writing. For this work subjects drawn from the work in literature are not advisable. In that the student is merely to put in shape things that he has learned. For more original work other subjects should be assigned.

R. C. HUGHES.

ENGLISH LITERATURE.

I. OBJECTS IN TEACHING ENGLISH LITERATURE.

1. That the student may not be ignorant of the important names and important achievements in English letters.
2. That he may come to a liking for good books.
3. That he may develop so critically discerning a taste as will give him a positive dislike for the crude and the vulgar.
4. That through literature he may come to a larger understanding of life.

The first of these is a matter of practical business importance, having to do with the student's ability to meet his fellows in the world of affairs on a footing of intellectual equality; the others are matters of culture and scholarship.

II. AMOUNT AND CHARACTER OF LITERATURE TO BE STUDIED.

1. The number of authors and works read should be enough to give the student a wide range. Too exhaustive study of a few works will deaden the interest of students of high school age. Moreover the study of literature is in part for the purpose of broadening the pupil's knowledge of life, and enough should be read to accomplish this.
2. A few authors should be studied critically for the purpose of securing object 3 above.
3. Nothing should be read so superficially that the student will not enter measurably into the spirit of the writing.
4. Literature of the narrative sort, whether prose or verse, serves best to stimulate interest in the subject when it is first taken up.
5. In the study of Shakespeare, dramas should be selected in which the pure story interest is strong, and in which the characters are distinctly individual and easily read. "The Merchant of Venice" and "Macbeth" are especially to be recommended, and the reading of them in the high school will presumably leave enough to be done with them in the later study of them in the college. It must be borne in mind that high school students are not prepared either by their experience of life or by their knowledge of literary art for any thoroughly appreciative study of Shakespeare, and there can be no question but serious study of Shakespeare by students not mature enough to get his deeper meanings will merely result in dislike for him.
6. The teacher should make careful study of the class and choose productions which will stimulate the interest of that particular class and which will in her judgment enlarge the sympathies of the individual members of the class.
7. The teacher should as far as possible direct the reading done by pupils in their homes.

III. THE STUDY OF LITERARY HISTORY.

1. Real knowledge of the historical development of English literature can come only through direct study of the literature itself, but this is a very much larger thing than can be accomplished in the high school.
2. It need hardly be said that Chaucer is not an author to be studied below junior or senior classes in college, but the

high school student who will not go to college, as most high school students do not, should know something about Chaucer. Obviously in this case, as in the case of Spencer and a host of others whom the high school student cannot read, he must get information "second hand" from some such history of literature as Stopford Brooke's "Primer of English Literature" or better still, from Johnson's "History of English and American Literature."

3. In the teaching of literature as in the teaching of other subjects, it must not be forgotten that the high school has a double mission; it must put one student in the way of the scholarly training which is to carry him further in college, and it must give another student the information as information which will enable him to make a good showing in the world of affairs without a college training.

Pedagogically, the thought most important is that the student should know how to study the work in hand.

1. To make this sure the teacher should prepare definite questions suited to the age of the pupils and leading them to find out for themselves the artistic and other qualities of the story or essay or poem.
2. In the story these should cover matters of meaning, phrasing, mood suggestions, character portrayal, description and management of plot to affect the reader's sympathies.
3. In the poem they should deal also with poetic forms, meter, figures, alliteration, rhyme and positive crudities as well as striking felicities of phrasing.
4. Among other things these questions should lead the student to the right placing of his sympathies, and to an understanding of the author's management of them.
5. Without didacticism, they should lead the pupil to an appreciation of the fundamental beauty or truth which gives the work in hand significance.

Note:—A few questions are here given as illustrations.

QUESTIONS ON "A HIGHLAND MYSTIC" IN THE "BONNIE BRIER BUSH."

- a. What do you understand by "The Transformation of Donald Menzies?"
- b. And what by the "open vision?"
- c. Would you call the description of Donald in the third paragraph good or not? And why?
- d. What changes in his mood in this paragraph? And how are they indicated?
- e. In the next paragraph what do you learn about Burnbrae from the fact that he always opens the conversation.

- f. What distinction in character do you note between Burnbrae and Donald as you read through the chapter?
- g. Indicate in the third paragraph any passages that seem to you especially well phrased and say why.
- h. For what purpose do you fancy this chapter was written?

QUESTIONS ON LANCELOT AND ELAINE.

- a. What is the meter in which the poem is written?
- b. In the first line what syllable that has a secondary accent should have a primary accent? And why?
- c. What characteristic in Elaine does the poet imply by "lily-maid?"
- d. What feeling makes her wish to be awakened by the gleam of mornings earliest ray?
- e. Why does she bar her door?
- f. What change of accent in line 24 to give added emphasis?
- g. Is the figure of line 58 effective or not? And why?
- h. Is the rhythmic movement of 1134-55 more or less rapid than 11-27?
- i. Is this story 1134-55 told to make the diamonds fair or evil fated? And what does the fact that there were two brothers have to do with this?
- j. What characteristic of the rivulet applies to the diamonds? 1152.
- k. And do you think the figure good or not? Why?
- l. What alliteration do you detect in line 89?
- m. Do you understand that Guinevere is petulant in 1197-1210 because she is displeased with Lancelot or because she is troubled in her own heart?
- n. What may you know about Guinevere from the "little scornful laugh?"
- o. Why does she say "he cares not for me?" And how has that affected her attitude towards him?
- p. To what by implication does she liken Arthur in line 134? And is the implied figure good, direct and vivid or not?
- q. In this talk does Guinevere or Lancelot seem the nobler?

GENERAL QUESTIONS ON THE COMPLETE IDYLL.

- a. How does the simplicity of Elaine's life affect our feeling for her in her declaration of love for Lancelot?

- b. Does Tennyson in this make choice of simple words or not?
 - c. What do you conceive is the effect of Elaine's death upon Lancelot?
 - d. Do you find that there are many or few pictures brought up in the mind in the course of the story?
 - e. Are they vivid or vague?
 - f. Are they produced with few or many words?
 - g. Where do you find one that seems especially effective?
 - h. Would you say that the diction is such as to suggest much or little to the imagination?
 - i. Does the verse seem to have color and feeling or is it cold? etc.
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LIST OF BOOKS SUGGESTED.

ENGLISH.

L'Allegro—Milton; Il. Penseroso—Milton; Ode to St. Cecilia's Day—Dryden; Cotter's Saturday Night—Burns; The Deserted Village—Goldsmith; Prisoner of Chillon—Byron; Tintern Abbey—Wordsworth; Intimations of Immortality—Wordsworth; The Princess—Tennyson; Idylls of the King—Tennyson; Enoch Arden—Tennyson; Marmion—Scott; The Lady of the Lake—Scott; The Rime of the Ancient Mariner—Coleridge; Ode to a Skylark—Shelley; The Cloud—Shelley; Iliad—Any Good Translation; Odyssey—Any Good Translation; Macbeth—Shakespeare; Merchant of Venice—Shakespeare; Julius Caesar—Shakespeare; Essays, Truth Studies—Bacon; Sir Roger de Coverly Papers—Addison; Sesame and Lilies—Ruskin; Heroes and Hero Worship—Carlyle; Essay on Milton—Macaulay; Pilgrim's Progress—Bunyan; Robinson Crusoe—Defoe; Tom Brown's School Days—Hughes; Swiss Family Robinson; Vicar of Wakefield—Goldsmith; Oliver Twist—Dickens; David Copperfield—Dickens; Old Curiosity Shop—Dickens; Treasure Island—Stevenson; Henry Esmond—Thackeray; Vanity Fair—Thackeray; Ivanhoe—Scott; The Talisman—Scott; Silas Marner—George Eliot; Romola—George Eliot; King of the Golden River—Ruskin; Crawford—Gaskell; Cloister and the Hearth—Reade; Water Babies—Kingsley; Balaustion's Adventure—Browning; Alice in Wonderland—Carroll; The Flight of a Tartar Tribe—DeQuincey; Last of the Barons—Bulwer; Don Quixote—Cervantes; Rasselas—Johnson; Jungle Books—Kipling; Life of Scott—Lockhart; Oliver Goldsmith—Dobson.

AMERICAN.

Hiawatha—Longfellow; Miles Standish—Longfellow; Evangeline—Longfellow; Snowbound—Whittier; Among the Hills—Whit-

tier; The Deacon's Masterpiece—Holmes; The Vision of Sir Launfal—Lowell; A Fable for Critics—Lowell; Bigelow Papers—Lowell; Commemoration Papers—Lowell; The Haunted Palace—Poe; Sketch Book—Irving; The Alhambra—Irving; Crayon Papers—Irving; Autocrat of the Breakfast Table—Holmes; Uses of Great Men, Friendship, Character—Emerson; Walden—Thoreau; Wild Apples—Thoreau; Hunting the Deer—Warner; Bunker Hill Monument Orations—Webster; Adams and Jefferson—Webster; Gettysburg Speech—Lincoln; Autobiography—Franklin; The Spy—Cooper; The Last of the Mohicans—Cooper; Twice Told Tales—Hawthorne; Mosses From an Old Manse—Hawthorne; Two Years Before the Mast—Dana; The Man Without a Country—Hale; Cudja's Cave—Trowbridge; Uncle Remus—Joel Chandler Harris; Ben Hur—Wallace; The Boy's King Arthur—Lanier; The Gold Rug—Poe; Rise of Silas Lapham—Howells; Prue and I—Curtis; Conspiracy of Pontiac—Parkman.

R. C. HUGHES.

AMY BOGGS.

LYDIA HINMAN.

HISTORY.

Few studies have been made more distasteful to younger students through ineffective and tactless teaching than history; yet there is scarcely a subject in the curriculum of secondary schools, that has greater potential value. Much, it is true, has been done in the last half-dozen years to carry into practice the suggestions that were made in the report of the Madison Conference, and many teachers owe increased efficiency to the stimulating report, which the committee of seven recently submitted to the American Historical Association; but in spite of these helpful reports, many of the most vital principles of historical work are still so habitually neglected, or overlooked, that they need frequent restatement and emphasis.

The method of instruction in history depends very largely on the estimate placed by the teacher on the aim and value of historical study. Few educators will feel inclined to dispute the now happily widely spread belief that the object of all secondary instruction is primarily mental training, but they are less generally willing to recognize that the teacher of history no less than the teacher of mathematics should participate in this work. The report of the Madison Conference took high ground when it said: "As studies in language and in the natural sciences are best adapted to cultivate the habits of observation; as mathematics are the traditional training of the reasoning faculties; so history and its allied branches are better adapted than any other studies to promote the invaluable mental power which we call the judgment."¹ This view is sus-

1. Report of Madison Conference, etc.

tained by the report of the committee of seven: "While it is perfectly true that the generalizing faculty is developed late, and that the secondary pupil will often learn unrelated data with ease, if not with avidity, it is equally true that history in the hands of the competent teacher is a great instrument for developing in the pupil capacity for seeing underlying reasons and for comprehending motives. In the ordinary class-room work, both in science and in mathematics, there is little opportunity for discussion, for differences of opinion, for balancing of probabilities; and yet in every day life we do not deal with mathematical demonstrations, or concern ourselves with scientific observations: we reach conclusions by a judicious consideration of circumstances and conditions, some of them in apparent conflict with one another, and none of them susceptible of exact measurement and determination."¹

The value of the study of history as a training for citizenship has now received very general recognition; and it almost savours of the common-place to say "that the most essential result of secondary education is acquaintance with social and political environment, some appreciation of the nature of the state and society, some sense of the duties and responsibilities of citizenship, some capacity in dealing with political and governmental questions, something of the broad and tolerant spirit which is bred by the study of past times and conditions."

We assent cordially to the plea of the committee of seven for the development of "*historical-mindedness*" in our school children. "All our institutions, our habits of thought and modes of action, are inheritances from preceding ages; no conscious advance, no worthy reform, can be secured without both a knowledge of the present and an appreciation of how forces have worked in the social and political organizations of former times. If this be so, need we seriously argue that the boys and girls in the schoolroom should be introduced to the past, which has created the present,—that *historical mindedness* should be in some slight measure bred within them, and that they should be given the habit, or the beginnings of a habit, of considering what has been, when they discuss what is or what should be?"²

It is equally important that our teachers should not forget the ethical import of historical study. If a pupil learns nothing else from the study of history, he should learn to appreciate the scientific spirit: "that every question should be approached without prejudice; that open-mindedness, candor, honesty are requisites for the attainment of scientific knowledge." Possibly too much has been made of the value of history so far as it is said to teach by examples. The exact conditions of historical events rarely repeat themselves; it is true, however, that what we speak of as historical forces are constant

1. Report of Committee of Seven.

2. Report of Committee of Seven, etc.

and that the recurrence of phenomena may be looked for with confidence where similar conditions are present. Under the guidance of a judicious teacher, errors in the lives of nations and individuals in history may have their salutary lesson for even the youngest pupil.

In insisting so strenuously upon the disciplinary value of historical study, we do not mean to underestimate its value for general culture. It is indeed well worth while for the pupil to know men and events of the past, if only to broaden his mental horizon and deepen his human sympathies, but this content of historical study we believe will be acquired most readily and helpfully, if the teacher aims constantly to secure quality rather than quantity of work. It is of little value to store a boy's head with information, if the process by which he has acquired that information is faulty. Correct thinking is of far greater importance than a mass of half assimilated facts. So short are the years of school life that fall to the lot of the average child, that his knowledge must necessarily be defective; his school days are but the beginning of a life-long quest. Does not wisdom suggest, then, that he should be taught, first of all, habits of thought that shall help him to acquire accurate knowledge in after years?

The problem that confronts the teacher at the very threshold of his work is the same that presents itself to every historian and student of history; what facts, what kinds of facts, are to be selected for study? No doubt the problem finds its solution very often through the temperamental bias of the student. To one, Mr. Freeman's dictum that 'history is past politics' is conclusive, and the governmental, constitutional phase of progress became his theme. The point of view of the writer of a "Short History of the English People" appeals to another, and for him resolves itself largely into a sociological study of the peoples of the past. The question is too broad for a discussion in these pages; we can only indicate certain principles that should govern the teacher in his choice of historical material. In the first place, the age and maturity of the pupil must be considered. It is obviously an inversion of the natural course of development to set children at work upon themes relating to constitutional history. In the earlier years of the child's life, biography and narrative history are most attractive and stimulating and it is only when the pupil approaches maturity that he is fitted to grapple with constitutional questions. In short, historical instruction must adapt itself to the mental preparedness of the learners. Secondly, we would urge the need of discriminating between different periods of history and between different nationalities. There are epochs when the doings of the King's court and of the King himself are the proper object of study, since the king is the state and the nation has not yet come into being. On the other

hand, there are times when all interest centers in the life of the people, as for example, when the democratic movement of modern times made itself felt. The teacher who tries to present French history in the same way as English history will speedily find difficulties in his way. The constitutional history of France is a meagre theme, while a history of England without reference to its constitutional development, would be like "Hamlet" with Hamlet left out. The whole question of the historical material which should be presented is one that is best left, with these general suggestions, to the good sense and the tact of the individual instructor.

Notwithstanding the very evident danger of instruction through a text-book of history, we believe that the use of a school history of well-attested merit is on the whole desirable. There is much, doubtless, to be said in favor of the "topical method," but it has serious drawbacks. "Without the use of a text it is difficult to hold the pupils to a definite line of work; there is danger of incoherence and confusion. While, therefore, we strongly advise the use of material outside of the text, we feel that the use of the topical method alone will in the great majority of instances result in the pupils' having unconnected information. They will lose sight of the main current, and it is the current and not the eddies which they should watch."¹ Realizing the truth of this criticism many teachers have sought to secure the advantages of the topical method without the accompanying disadvantages, by assigning topical work in several text-books. So far as this scheme induces the pupil to compare the statements of different authors and to form his own opinion of the subject under discussion, it is a commendable advance upon the old-fashioned use of a single text-book, but it does not altogether avoid the objections urged against the topical method alone. In the end, the work of bringing unity and cohesion into the body of facts culled in this fashion from different sources, will fall upon the teacher, who must needs be both efficient and well informed, if he is to be equal to the task.

If a single text-book is used, it should be chosen with the greatest care. The old-style school history with its pragmatic, dry-as-dust chronicle of facts, should be relegated by this time to the limbo of pedagogic antiquities. A school text-book should combine accuracy with genuine literary merit; the style should be clear, and entertaining; a proper sense of proportion should be observed so that the reader may grasp the relative importance of the facts presented. There is no more common failing among writers of school history than inability to understand historical perspective. The anecdotal history sins repeatedly in this regard. How often will the pupil glibly recite an anecdote, and forget the important point which it should illustrate!

1. Report of Committee of Seven, p. 91.

"A text-book ought to be something more than the mere development of a 'story', it ought to include something on the social and economic side, as well as on the political; and it ought to [refer to, and facilitate, outside reading and the preparation of topics." The familiar illustrations of the older text-books are of doubtful value; far more desirable are reliable physical and political maps. In emphasizing the probable value of a single text-book, we do not by any means intend to discourage the use of other text-books or of outside material. The text-book should be supplemented constantly by topical references to the chief secondary authorities. By judicious selection of outside reading the teacher can avail himself of all the advantages that the topical method offers, without sacrificing the continuity of the class work. If the aim of all topical work should be to lead the pupil to form his own judgment of men and things through comparison of several authorities, nothing can be more stimulating to the pupil's intelligence than to have him read authorities whose views run counter to familiar traditions. If a pupil reads Mr. Fiske's version of the earlier events in the American Revolution, he should also be urged to read Mr. Lecky's account of those same incidents. Written topics prepared in this way are of the greatest value as a training, not only in habits of criticism, but in forms of expression.

Such topical work, we need hardly add, must be suited to the age and intelligence of the pupil. To expect a boy of fourteen to prepare a scholarly paper on a subject that is still mooted by leading authorities, is manifestly absurd; particularly when there is abundance of suggestive themes that will lead even the most immature boy or girl to an appreciative acquaintance with the best secondary histories. Even when a pupil's immaturity makes comparative study of several authorities inadvisable, he may be taught to report in his own words the account that he has found in a reliable history; in no case should the teacher suffer a pupil to reproduce an author's words or phraseology. Whenever practicable, the pupil should append a brief bibliographical note to his paper to show where he found the material that he used; since he cannot be taught too early the need of stating the exact authority for his statements.

Topical work of this sort suggests the urgent need of historical libraries in our schools. "The library should be the center and soul of all study in history and literature; no vital work can be carried on without books to which pupils may have ready and constant access. Without these opportunities, historical work is likely to be arid, if not unprofitable; there cannot be collateral reading, or written work of the most valuable sort, or study of the sources, or knowledge of illustrative material. Even a small expenditure of money may change the dull routine of historical study into a voyage of pleasurable discovery, awakening the interest, the enthusiasm, and the whole mental power of the pupils. No school is so poor

that something cannot be done in the way of collecting material."¹ Every school that aims to teach history in anything more than a perfunctory way, should have a library supplied with reliable secondary histories, and some collections of sources. Historical atlases, encyclopaedias, and general historical handbooks, are of course an indispensable part of the library equipment. It is to be hoped that our school-boards will soon realize that books are as necessary a part of the school's equipment as are chemicals in the school laboratory.

How far the use of sources should be encouraged in secondary schools is a question not easily answered. So far as the so-called "source-method" is concerned, we incline to the position taken by the committee of seven. "The difficulty with this system is, that while it suggests the basis of original record upon which all history rests, on the other hand it expects valuable generalization from insufficient bases. Within the covers of one book it is impossible to bring together one-hundredth part of the material which any careful historical writer would examine for himself before coming to a conclusion; and it is not to be expected that inexperienced and immature minds can form correct notions without some systematic survey of the field. Indeed the attempts to teach history wholly from the sources ignore the fact that the actual knowledge of the facts of history in the minds of the most highly trained teachers of history, comes largely from secondary books; it is only in limited fields, where a large mass of material can be examined and sifted, that historians and teachers can safely rely for their information entirely on sources, and even there they find it useful to refer to the secondary work of other writers, for new points of view."² We agree, too, with the committee of seven in thinking it "unwise for pupils in secondary schools to attempt original investigations. For such advanced work they have neither the necessary maturity nor training. It is, however, both possible and essential that pupils should come into contact with a limited body of materials, an examination of which may show the nature of the historical process and at the same time may make the people and events of by-gone times more real."

Sources should not be put indiscriminately into the hands of pupils; here again the age and general intelligence of the individual pupil must be the teacher's guide. It is a questionable use of time, for example, for younger pupils to try to read and understand colonial charters; the points that are essential for their understanding of colonial institutions can be much more readily grasped at second hand. But how full of interest [for even the youngest child, a chapter from Bradford's "History of Plymouth Plantation;" or Besse's "Sufferings of the Quakers" may become! Older students may very well read some of the more weighty documents and learn

1. Report of Committee of Seven, p. 97.

2. Report of Committee of Seven, p. 101.

to discriminate between trustworthy and untrustworthy authorities; many of the essential principles of historical criticism can be made clear by an inquiry into the probable veracity of the author under discussion. "Besides the sources which have come down to us in written form and are reproduced upon the printed page, there is another important class of historical materials which is of great assistance in giving reality to the past,—namely, actual, concrete remains, such as exist in the form of old buildings, monuments, and the contents of museums. Many schools have direct access to interesting survivals of this sort, while the various processes of pictorial reproduction have placed abundant stores of such material within reach of every teacher." "It is easy to make too much of illustrations and thus reduce history to a series of dissolving views; but many excellent teachers have found the judicious use of pictures helpful in the extreme, not merely in arousing interest in the picturesque aspect of the subject, but in cultivating the historical imagination and in giving definiteness and vividness to the pupil's general ideas of the past."¹

Few teachers in secondary schools will advocate instruction by means of formal lectures; the recitation is likely to maintain its place for reasons that are obvious to all practical teachers. Nevertheless, reform in class room methods is sorely needed, where the old style of perfunctory question and parrot-like answer still persists. Of all methods of instruction such recitations are surely the most pernicious, stultifying alike to teacher and pupil. The class room should be something more than a place of examination; the teacher more than a recording clerk. The class exercise is the teacher's opportunity for expanding and commenting upon the themes suggested by the text-book, and his every effort should be to rouse the interest of his pupils in the essential features of the lesson and to lead them to discover for themselves the underlying causes for the events that they have studied.

Almost any devices that bring life and interest into the class room exercises are commendable. Impromptu debates, verbal reports on assigned topics, and other expedients, will readily occur to the teacher, who is earnestly intent upon escaping from the thralldom of the "regular recitation." Experienced teachers will testify to the stimulating effect of an analysis of the day's lesson worked out on the black-board by teacher and pupils. An excellent way of riveting the attention of pupils upon the class work, is that of requiring all to record in note books the line of discussion and any new material that the teacher may have to offer. Frequent written exercises may well supplement the class exercises, if only to enable the teacher to know the indolent spirits who are prone to

1. Report of Committee of Seven, pp. 108-109.

let their more active and ambitious comrades do their thinking for them.

It is significant of the current conceptions of history that school children so frequently complain that they cannot remember dates, as though dates were the chief thing to be acquired in historical work. Much might be done to root out this prevalent misconception of history, if teachers themselves would bear in mind that disconnected events and isolated dates are not history, but only the raw material out of which the historian constructs his narrative; teachers have too often mistaken chronicles for histories. The study of history like the writing of history, involves infinitely more intellectual labor than the simple arraying of fact upon fact, in chronological order. Between the facts and behind the facts the student must search for the casual relation which gives continuity and meaning to human events. Not all dates, not all facts, are of equal importance, and it is no small part of the historian's task to distinguish the important from the unimportant, the essential from the accidental. While it is clear, then, that not all dates or facts are worth remembering, there are certain ones that should be fixed in the memory, otherwise our knowledge loses its coherence, but these are so comparatively few and connected by so many lines of association, that their recall becomes a matter of little effort.

Many a lesson in history might be brought home with greater force to pupils, if the teacher were more keenly alive to the dependence of history upon geography. No school should be without a supply of accurate wall maps indicating physical features as well as political divisions. "The pupils should not lose sight of the physical causes that have acted in history any more than they should ignore the human causes; and they must remember that, although history deals with the succession of events, there is always a place relation as well as a time relation. As new meaning is given to geography when physical conditions are seen in relation with human life, so reality is added to historical occurrences and new interest is awakened in historical facts by the study of the theatre within which men acted and notable events took place."¹ The teacher must be on his guard in using political maps, since they can at best indicate boundaries only as they exist at a given point of time, and may often lead the pupil to forget the fluctuations of national boundaries.

Space will not permit more than a brief reference to the courses that should find a place in the curriculum of secondary schools; it will suffice, perhaps, to quote from the report of the Committee of Seven. These men have devoted so much time and labor to the subject, that they are entitled to speak with authority. "As a thorough and systematic course of study, we recommend four years of work,

1. Report of the Committee of Seven, p. 96.

beginning with ancient history and ending with American history. For these four years we propose the division of the general field into four blocks or periods, and recommend that they be studied in the order in which they are here set down, which in large measure accords with the natural order of events, and shows the sequence of historical facts:—

(1). Ancient History, with special reference to Greek and Roman history, but including also a short introductory study of the more ancient nations. This period should also embrace the early Middle Ages, and should close with the establishment of the Holy Roman Empire (800) or with the death of Charlemagne (814), or with the treaty of Verdun (843).

(2) Mediaeval and Modern European History, from the close of the first period to the present time.

(3) English History.

(4) American History and Civil Government.”¹

Such an extended course of study as this, is thoroughly in accord with the view that history should be given greater consideration because of its value as a disciplinary study, but there are probably few schools where this program can be adopted at once. For such schools the Committee of Seven has this recommendation: “If only three years can be devoted to historical work, three of the periods outlined above may be chosen, and one omitted; such omission seems to us to be better than any condensation of the whole. But if any teacher desires to compress two of the periods into a single year’s work, one of the following plans may be adopted. (1) Combine English and American history, in such a manner that the more important principles wrought out in English history, and the main facts of English expansion, will be taught in connection with American colonial and later political history. (2) Treat English history in such a way as to include the most important elements of mediaeval and modern European history.”²

ALLEN JOHNSON.

LATIN.

The aims of a secondary school course in Latin extending over four years are quite generally understood and pursued. Supposing, as this report does, that five recitation periods a week are to be devoted to the study during at least three of the four years, there should be no insuperable difficulties in the way of completing the minimum amount recommended in the REPORT of the COMMITTEE ON COLLEGE ENTRANCE REQUIREMENTS presented to the National Educational Association at its meeting in July, 1899. Since this Report

1. Report of the Committee of Seven, pp. 34, 35.

2. Ibid, p. 43.

must inevitably set the standard of the four-year Latin course for years to come, it appears desirable to reproduce it here for the benefit of teachers and school authorities generally.

FIRST YEAR.

Latin lessons, accompanied from an early stage by the reading of very simple selections. Easy reading: twenty to thirty pages of consecutive text. In all written exercises the long vowels should be marked, and in all oral exercises pains should be taken to make the pronunciation conform to the quantities.

The student should be trained from the beginning to grasp the meaning of the Latin before translating, and then to render into idiomatic English and should be taught to read the Latin aloud with intelligent expression.

SECOND YEAR.

Selections from Cæsar's *GALLIC WAR* equivalent in amount to four or five books; selections from other prose writers, such as Nepos, may be taken as a substitute for an amount up to, but not exceeding, two books.

The equivalent of at least one period a week in prose composition based on Cæsar.

Reading aloud and translating, together with training in correct methods of apprehending the author's meaning, both prepared and unprepared passages being used as material. The memorizing of selected passages.

THIRD AND FOURTH YEARS.

Sallust's *Cataline*. Cicero: six to nine orations (including the *Manilian Law*). Ovid, 500 to 1500 verses. Virgil's *Æneid*: six to nine books. The equivalent of at least one period a week in prose composition based on Cicero. The reading of Latin aloud. The memorizing of selected passages.

The adoption of this course is not only demanded by considerations of self-respect, but it is also far from being impracticable. Preparatory to drafting the statement concerning Latin in this publication, letters of inquiry were sent to twelve of the principal high schools of Iowa, and from eight reports were received in reply. Although the information obtained in this manner was not in all cases as detailed as was desired, it appears that the above-mentioned requirements for the first and second years are substantially met in all of the schools. In the third and fourth years some deficiencies occur, due chiefly to the circumstance that four instead of five periods a week are devoted to the study. Six orations of Cicero and nine books of Virgil's *Æneid* are almost universally read. Here and there a sufficient amount of Ovid is taught. In view of the fact that the *Metamorphoses* presents so much less difficulty to

the beginner in reading hexameter verse than the *Æneid*, it would seem advisable, even from considerations of time economy, to give a few weeks to this author. Add to this that the enhancement of interest accruing from the reading of a new author amply compensates for a certain loss of time, and we have said sufficient to recommend the introduction of a modicum of Ovid. Quite frequently an additional oration or] some letters of Cicero are read in lieu of Sallust's *Cataline*. Some of the considerations favorable to Ovid apply with equal force to Sallust. And in addition, this historical monograph possesses to an unusual degree intrinsic interest for the scholar, especially when read [preparatory to, or in conjunction with, the *Catalinarian* orations of Cicero. A few high schools have successfully employed selections from it as material for sight reading.

There is one matter deserving of more than passing mention. It is the subject of Latin prose writing, almost universally neglected in Iowa. Easy exercises in the writing of Latin should accompany the other phases of the instruction from the first, because they give an intimate knowledge of the essential forms and a readiness in the use hardly to be attained in any other way. In many high schools the insufficient number of recitation periods has led to the omission of such exercises very much to the detriment of the instruction in all of its aspects. It is to be hoped that, when five periods a week are granted, teachers may not yield to the temptation to spend the added hours entirely in increasing the amount of Latin to be read, but may avail themselves of the better opportunities for reinforcing the fundamentals by devoting much of the gain to this important work. Prose composition based on Cicero is quite too generally omitted while the class is busied with the reading of Virgil. In many schools, however, an ample equivalent, though hardly of a kind with it, is provided in the weekly period devoted to the study of classical mythology.

Owing to its fundamental character, the first year Latin deserves especial mention. In pursuing the lessons, accuracy in the recognition of inflectional forms is hardly more important than correct pronunciation in conformity with the quantities, which can be attained only by constant practice in reading aloud under the punctilious instruction of the teacher. It is the experience of schoolmen generally that the slightest neglect of this exercise even for a short time at this early stage, works irreparable harm. Reading aloud should not, however, be discontinued at the end of the first year, but should be made auxiliary, from the first and always, to another phase of Latin instruction, which is also of great importance,—grasping the meaning of the text before translation, itself indispensable if the student is to render it into idiomatic English. If reading aloud be continually practiced in the manner described, 'the intelligent expression,' which every teacher

desires above all to catch, may not be the unattainable ideal it is sometimes thought to be.

Quite as indispensable as the oral practice is the marking of all long vowels in the written exercises. In fact, the two necessarily run parallel, and unless the latter is practiced consistently the pronunciation will deteriorate. It will be found helpful in this respect if the teacher will occasionally read aloud some simple connected passage and have the scholar translate from hearing. But perhaps there is no exercise that promises better results in all directions than the memorizing of selected sentences and, in due course, of connected passages. Poetical quotations are especially adapted for this purpose and facilitate fixing in memory the quantities. A live teacher by such devices can combine the learning of paradigms with a concrete mastery of the language, and such is, of course, the ideal we set ourselves in the beginnings of Latin.

If, as is here assumed, five periods a week throughout three years and four periods in the fourth year are given to Latin in the high school, most of the deficiencies here touched upon may be readily supplied. In view of the rapid progress in the co-ordination of courses of study the country over, there ought to be no doubt or hesitation about the standard. The four-year course recommended by the National Educational Association should be adopted by our high schools at once, where it is not already in operation. Yet there should be nothing farther from our thoughts than the reduction of the entire Latin curriculum to a system of hard and fast requirements. To insure the maintenance of the teacher's interest in his work, upon which in the last resort all his success depends, some considerable scope must be reserved to his initiative, and due allowance must always be made for special endowments and individual methods.

Good courses, however, do not guarantee good teaching. At this point all prescriptions fail. Unless teachers of Latin in the secondary schools are filled with a lofty ambition constantly to improve their methods of presentation and the vital sympathy they possess for the subject-matter of their instructions, Latin will be in fact, as it is in name, a dead language. The increased interest in the study, evinced in the growing numbers of those who take it in our schools, indicates that the teacher is growing with his opportunity. May this prove to be the fact.

WILLIAM A. HEIDEL.

LOGICAL VALUE OF LATIN.

It is not enough to say that the ultimate aim of the study of Latin is to *appropriate* the language, to come into vital touch

with the thoughts and feelings of the Roman world through the medium of the literature. The great majority of those pursuing the study for a limited time never reach this ideal. Its value for those who pursue it for a few years only is very great in that it affords an effective instrument in the training of the logical powers. All the logical processes are brought into constant play. Perception, judgment, ratiocination are exercised. "The Rule," is the major premise and in the verifying of it all the inductive processes are employed. The page of Latin literature thus affords a field for classification, such as meadow and wood afford the botanist. Between the microscopic pettiness of the old parsing system and the reaching after things only in their largeness there is a golden mean most serviceable to the average boy and girl in our public schools.

F. C. EASTMAN.

MATHEMATICS.

Of the various branches of study pursued in the high school none is of greater importance than mathematics, and this is equally true whether the study be considered with reference to its practical or to its disciplinary value.

Fortunately, expensive material equipment is in no way essential to the successful teaching of mathematics; in fact, the competent teacher may well dispense with everything but his supply of chalk and ample blackboard room. While the writers have had much better opportunities to observe the results of the mathematical training afforded by our high schools than the means employed in obtaining these results, they have never been inclined to believe that the inadequacy of such training, where it is inadequate, is in the slightest degree due to insufficient material equipment. While mathematical models may serve a useful purpose in giving to children some fundamental notions regarding geometrical figures, they need not be taken to the class room where formal algebra and geometry are taught.

The one thing needful above all else, to secure good high school work in mathematics, is an enthusiastic teacher full of his subject, and having a capacity for a great deal more of it than he is required to teach. Mathematics cannot be successfully taught by the teacher lacking special fitness and training for such work any more than can Latin or physics, German or botany. To expect one having no knowledge of the subject beyond the mere elements of algebra and geometry to successfully teach these branches is an absurdity that high school principals would not permit themselves to tolerate in the supervision of their work in language or in science. In general, no teacher can be considered as properly qualified to conduct students through the mathematics required

for admission to college who has not familiarized himself with the intimate relationship between algebra and geometry by the study of analytic geometry, and with the doctrine of limits as applied in the differential and integral calculus. In other words, the equivalent of at least the first two years of collegiate mathematics should be required of the teacher having charge of this branch in the high school.

Apropos it may be stated that many of the students entering our colleges with the best preparation in mathematics come from our smaller high schools,—from high schools knowing no such adjunct as a physical laboratory, a museum, or perhaps even a respectable library. The reason for this is apparent and its statement may be suggestive. In such schools the temptation to depart from a few fundamental lines of work is much less than in the better equipped high school having a larger corps of teachers. The small high school affords just the opportunity for that concentration of the pupil's energies upon English, mathematics, and one of the foreign languages, that lays the best possible foundation for a solid course of study in college. It should be added, in justice, that many of the most poorly prepared students entering college come from the small schools in which, without proper equipment and teaching force, the attempt is made to cover a range that may with greater propriety be undertaken by the well equipped high school of the large town or the city.

Of all the tangible causes of poor preparation for college, as regards mathematics, the most common is that sufficient time has not been devoted to their study. Even when the rudiments of algebra are acquired in the grammar grades, not less than a year and a half should be spent upon the subject in the high school. Another year and a half must be given to plane and solid geometry. It should be noted that the above does not include the time which should be given to reviews in the fourth year of the course.

It must be assumed that the student entering the high school has mastered the topics ordinarily studied in arithmetic. The rather common practice of introducing the notation and something of the methods of algebra in connection with the more advanced grammar school work in arithmetic is certainly to be commended. Not only may many of the topics there studied be more satisfactorily explained by the use of simple algebraic notation, but in these simple concrete applications of algebra the way is made easier for the comprehension of the general reasoning characteristic of the science.

It is also deemed important that, either in the grammar school or at the beginning of the high school course, the pupil be introduced to the study of geometry by the heuristic method. The teacher undertaking this work with a class may find many helpful sugges-

tions in William George Spencer's *Inventional Geometry*, (D. Appleton & Co., 1877) and in other more recent works of similar character.* "Of course," as Herbert Spencer remarks in reference to his father's work, "the use of the method implies capacity in the teacher and real interest in the welfare of his pupils." The pupils should be provided with simple drawing instruments, which they may easily be taught to use. Many valuable geometrical concepts may be developed; and the practical value of the work, if conducted by a skillful teacher, can scarcely be overestimated. The spirit in which the work should be conducted should be that of the laboratory, where the student is induced to discover facts and relations for himself. Lines may be bisected, perpendiculars erected, various geometrical figures drawn, plans and elevations of solids of various forms constructed, equal angles laid off, even the value of π determined with as much precision as was attained by the priests of Egypt.

The introduction of this so-called synthetic geometry at this early stage will make it impossible to impress upon the mind of the pupil, as he pursues his mathematical studies, the essential unity of algebra and geometry. There can be no greater mistake than to assume that algebra should be finished before geometry is undertaken. The whole history of mathematics is a protest against such a course. It would be better, setting aside all questions as to text-books, to reverse this order and require the pupil to finish his Euclid before being introduced to formal algebra.

Upon resuming the study of algebra in the high school increased attention should be given to the logical aspect of the various processes discussed. The first great difficulty which the pupil meets in the study of algebra is in comprehending the significance of the minus sign. Whatever method may be employed in dealing with this difficulty it is almost certain that, in going over the subject for the first time in the grammar school, the only result will be that the pupil learns to follow somewhat blindly the empirical rules governing the use of the sign. It is hardly to be expected that the matter will be fully comprehended until he is able to rise to the conception of a number as a directed line; and of the minus sign as an operator which, applied to a number, reverses its direction or sense. However, this can hardly be expected of pupils in the grammar grades, totally unfamiliar with the notion that algebraic expressions are capable of geometrical interpretation.

Great care should be taken at the outset to prevent, on the pupil's part, erroneous notions as to the value and meaning of negative quantities. It will be well worth while to explain that the zeros from which we measure magnitudes are arbitrarily assumed. Thus:

*Among such works may be mentioned: Campbell's *Observational Geometry*, Harper & Brothers, 1899; Hopkin's *Manual of Plane Geometry*, D. C. Heath & Co., 1891; Keigwin's *Geometry*, Henry Holt & Co., 1898; Van Velzer and Shutt's *Plane and Solid Geometry* (Tracy Gibbs & Co., Madison, Wis.), is the most complete work on the "inventional" plan yet examined by the writer.

the zero of the thermometer is not an absolute zero, the zero of chronology is not the beginning of time, that from which altitudes are estimated is not the lowest level conceivable, etc. It will then be easy for the novice to understand that a unit measured in the negative direction from an arbitrary zero has the same absolute value as one measured in the positive direction. Numberless specific examples may be given to illustrate this point. Thus: a ship in latitude -1° is exactly as far from the equator, whose latitude is zero, as another in latitude $+1^{\circ}$; Dead Sea, at an altitude of -1400 ft. is just as far from sea-level, whose altitude is zero, as Spirit Lake, Iowa, whose altitude is $+1400$ ft., etc. It is not only needless, but it is misleading to resort to such statements as "A minus quantity is a quantity less than nothing," or "Minus 6 is 6 less than zero."

The above clearly understood it may be pointed out that we have simply assumed that the minus sign reverses the direction or "sense" of the quantity before which it is written. Now, this is a purely arbitrary interpretation of the significance of the sign in question; and here seems to be the great stumbling block of both pupil and teacher,—the difficulty of seeing *why* this is so. The fact is that it is so simply because mathematicians have chosen to so interpret the minus sign; they have agreed to regard -1 as an operator which, applied to any quantity whatever reverses its direction or sense. All that remains to be done is to follow this interpretation to its logical consequences. It appears at once that minus a negative quantity is a positive quantity; thus: $-(-q) = q$. It will be observed that the arithmetical notion of the minus sign, as a sign of mere subtraction or "taking from," has been abandoned; and the sooner this notion can be abandoned by the teacher of algebra the better.

The operation of multiplying by a negative quantity may now be logically interpreted. Let the multiplier be $-m$, which may be written $(-1 \times m)$. In order to multiply by $-m$ we must therefore multiply by (i. e., operate with) -1 , which reverses the sign of the multiplicand, after which the result of this operation must be enumerated m times. Algebraic division may perhaps be most readily disposed of by regarding the dividend as the product of quotient and divisor.

It is not presumed that the teacher of algebra can deal with the question of the minus sign in the above summary manner. However, the line of treatment indicated is that which should be strictly adhered to, whatever simplification may be necessary in the classroom. The able teacher will resort to no subterfuge. If the matter is really too difficult for the pupil's comprehension, it were better to allow him to work by mere rule than to imagine he has explained the operations of algebra from the standpoint of arithmetic.

In the high school course the pupil should be familiarized with every form of algebraic notation and with the use of equations of the simpler types. However, this purely mechanical facility in handling algebraic expressions should not be made an end, but rather a means. It is highly important that the pupil be able to state given definite relations between things in mathematical language, that is, by means of algebraic symbols. Without this ability, any amount of facility in the manipulation of algebraic forms is of comparatively little use. It is the formation of the equation employed in the solution of a given problem, rather than the purely mechanical process of "finding the unknown," that puts the reasoning powers of the student to the severest test. It is in the reduction of problems to symbolic statement, not in the mere juggling of the symbols themselves, that algebra affords a high type of mental discipline.

It is not to be inferred from the above that the purely mechanical or manipulative processes of algebra are to be regarded as of secondary importance in the practical teaching of the subject. The means to the end which should be kept constantly in view are, after all, no less important than the end itself; and there is little danger that the mechanical processes of algebra will receive too much attention. The real difficulty is that in too many cases the teaching of mathematics is itself quite too mechanical a process. Pupils are assigned exercises from the text-book without any clear idea as to the purpose to be served by such exercises. Again, too much time is devoted to problems which have no conceivable relation to anything except to their own answers; which criticism applies with more force to current text-books than to the teachers using them.

At every step the matter of correct notation and correct form should be given careful attention. Pupils should, for example, be broken of the very common habit of connecting with the sign of equality expressions which are not equal, but which are merely derived from each other. In this connection another point, too frequently overlooked, may be specifically mentioned, viz: that conditions and operations would better be expressed in the first member of an equation, and the results in the second.

Geometrical concepts may be and should be constantly associated with algebraic forms. For example, x^2 may be considered as representing the area of a square, each of whose sides is the line x ; ax that of a rectangle having the sides a and x ; while in such an expression as $x^2 \pm 2ax$, the terms x^2 and $2ax$ may be referred to as the square term and the rectangular term respectively. In fact this expression ($x^2 \pm 2ax$) may be represented as a square of side x ,

ax	a^2
x^2	ax

bordered on two (adjacent) sides by rectangles of width a and x , thus leaving a notch at one corner which may be exactly filled out by the addition of the square whose side is a ; which last operation is, by the way, merely the geometrical equivalent of the algebraic process of "completing the square" of the given expression. Such ideas, simple in themselves, should be followed out as far as the student's limited knowledge of geometry will warrant.

In presenting the theory of the quadratic equation care should be taken to impress upon the mind of the student the fact that every such equation has *two* roots, even though they be equal. In no case should he be allowed to solve such an equation without finding *both* roots; and if the equation has originated in the statement of a problem of any sort, the significance of both roots should be carefully examined. In a recent entrance examination, held at one of our colleges, the following problem was proposed: "A rectangular lot contains 180 square rods. If one side were increased five rods and the other six rods, its area would be doubled. What are the dimensions of the lot?" Of about thirty candidates taking the examination a good percentage obtained a correct solution; but only one obtained both solutions of the problem. The instance is an instructive one and is cited only for that reason.

There is no operation in algebra of greater importance than that of factoring, and the student should be so persistently drilled in the process that all the ordinary composite expressions, when presented to him, fall at once into their primal elements. Familiarity with algebraic forms is of the greatest importance to the student undertaking the study of higher mathematics, and in no way can he be taught to recognize and comprehend such forms more readily than by continued exercise in factoring. Incidentally he should learn to regard the solution of an equation, whether of the first, second, or higher degree, as being essentially a process of factoring.

The processes of finding the highest common divisor and the lowest common multiple should be carefully analyzed and thoroughly mastered by practice. Both processes are of considerable importance in advanced algebra.

The subject of radicals is one in which students are always more or less deficient upon entering college. A thorough mastery of the theory of exponents is doubtless the simplest means of clearing up the difficulties attending the use of the time-honored radical notation. Familiarity with the significance of fractional and negative exponents is indispensable to the student of higher mathematics, and their frequent use should be insisted upon from the beginning. It may be noticed that the principles involved in the use of logarithms are but an application of the theory of exponents. As a matter of notation the student should be required to express his results, when fractional, in such form that all denominators shall be rational: thus, "one divided by the square root of two." The significance of "zero" as an exponent should be carefully explained.

In both algebra and geometry, ratio and proportion as well as the closely related subjects of variation, should be very carefully and thoroughly taught. The ideas here involved are probably the most fundamental and far-reaching of any in the whole field of mathematics.

In the study of geometry the difficulty encountered by the student lies rather in the vagueness of his conceptions than in the subtlety of the reasoning, this being of the very simplest sort. In fact, pure reasoning does not afford the best mental discipline. "No argument presents serious difficulty or calls for much mental effort to follow it when once its terms are clearly understood; for no such argument can be harder to understand than the general syllogism of which it is a special case, and that is of well-known simplicity. The real difficulty lies in forming clear notions of things; and in doing this all the higher faculties are brought into play. It is this formation of concepts, too, that is the really important part of mental training. He who forms them clearly and accurately may be safely trusted to put them together correctly. Logical blunders are comparatively rare. Nearly every seeming mistake in reasoning is really a mistake in conception. If this be false, that will be invalid."

The student should, accordingly, be at once thoroughly grounded in the definitions and language of geometry. There should be nothing vague about the one, and nothing indefinite or ambiguous about the other. No other exercise in the high school curriculum affords as good an opportunity for training in the exact and concise use of English as does the recitation in geometry. Not only should purely geometrical terms be correctly used, but the confusion of such terms as similar, equivalent, equal, and identical should be carefully avoided. Every theorem should be clearly understood before its demonstration is attempted, and the student should be able to state it correctly and concisely, whether

the language used be his own or that to be found in the book. The practice of memorizing theorems by number and book has nothing to recommend it at the present day, whatever may have been the case when Euclid was the text universally used. In the demonstration at the blackboard the figure used should not be a duplicate of that found in the text, nor should the same lettering be permitted. Each theorem should stand for a definite, but not isolated, geometrical concept without being associated with any particular figure by which it may have been demonstrated.

The constant use of drawing instruments should be not only encouraged, but insisted upon. A compass, a pair of dividers, a straight edge, a good scale of equal parts, a small "T square," and a rectangular pine board of dimensions $16 \times 12 \times \frac{1}{2}$ inches, together with a few "thumb tacks," make up a very satisfactory and yet cheap laboratory equipment for the study of geometry. Every theorem discussed should be the subject of careful construction, and original problems should be treated in the same thorough manner. Patterns for cardboard models of the various solids studied should be drawn and the models themselves constructed. The study of geometry thus assumes something of the nature and acquires much of the practical value of manual training. The constant introduction of original problems of a difficulty carefully adjusted to the acquirements of the individual student is a matter of the very greatest importance and should never be neglected.

Attention may here be called to the fact that the relation between algebra and geometry is a mutual one. Not only does algebra admit of geometrical interpretation, but on the other hand, geometrical relations really lend themselves to analytical expression. The teacher familiar with analytical geometry will find many opportunities to make use of the fundamental unity of the two sciences.

It may be suggested in this connection that the "dimensions" of the formulae of geometry may be observed to good advantage. For example, the formulae for the area of a triangle, $\frac{1}{2} ab$, is of the second degree in the linear dimensions, a and b , of the figure. The same is to be observed of the formula of any area; while it is equally true that the formulae for volumes are uniformly of the third degree, whatever linear dimensions may be employed in such formulae. Much of the confusion of formulae commonly observed among students, e. g., the confusion of those for the area and for the circumference of a circle, may be avoided by calling attention to this principle. Moreover, this theory of the "dimensions" of magnitudes is of the widest application alike in the mathematical and in the physical sciences.*

*See W. Stanley Jevon's *Principles of Science*, Second Ed., p. 325.

Another point to be emphasized as the student gains command of a considerable range of geometrical facts is that there is a certain continuity running through whole groups of theorems. It is easy to show, for example, that the theorems giving the square on the side opposite an obtuse angle of a plane triangle, and that giving the square on the side opposite an acute angle are in reality continuous through the Pythagorean theorem. It is a splendid exercise now and then, and an excellent review as well, to follow a theorem back to the fundamental axioms of geometry.

No effort should be spared to make it clear to the student that geometry is a flawless piece of logic. He will find it at first a structure of bewildering complexity; in the end, if properly taught, one of amazing simplicity. That he may make this progress, however, the subject must be constantly reviewed; and, moreover, there must be required of him, not merely a passively receptive attention, but an actively sustained attention such as he has not before been called upon to exercise. It is the inability, or at least the failure, to yield this necessary attention, and not the difficulty of the reasoning, that constitutes the great stumbling block of students of mathematics in general. The faculty of yielding such attention to any matter under consideration, whether it be a theorem in geometry or a question of every-day life, is the greatest benefit which the study of mathematics can bestow; and no other study in the high school can quite compare with that of geometry in the extent to which it develops that faculty.

In order that the student may take up the mathematics of the freshman year in college to advantage he should carry his high school work in that subject through to the end of his course. During the last year in the high school an energetic review of the whole course in mathematics should be undertaken. Not only will this review be found beneficial in itself, but the higher point of view now attained may be taken advantage of in many ways.

It too frequently happens that students are seriously handicapped upon entering college by having spent the last year in the high school upon studies which have little value as preparatory work. How this difficulty may best be remedied is a question which needs to be seriously considered. That the public high school cannot be merely, or even primarily, a preparatory school for the college is obvious enough; but it does not seem unreasonable to hope that, as our high schools come to be more liberally supported, special preparatory courses may be provided for such students as intend to continue their studies in college. This break in continuity now existing between the work of the high school and that of the college is one of the most serious defects in the present educational curriculum,—one which is becoming more

serious as the opportunity to obtain a college education is open to an ever increasing number of young men and women.

LAENAS G. WELD,
D. S. WRIGHT.

PHYSICAL GEOGRAPHY.

EDUCATIONAL VALUE OF PHYSICAL GEOGRAPHY—Your committee commends the well-nigh universal study of Physical Geography in the schools of the state; and its members indulge the hope that, as larger and larger place is given to science in the future, the room allotted to the group of earth sciences will be increased rather than diminished. These sciences, we believe, are surpassed by none in educational value to the student preparing for college or for life. The imagination is tasked to conceive the processes of nature and the place of our planet in time and space, and is ennobled to a degree impossible with fanciful, romantic and merely literary material. The study of nature is also of the highest ethical value. Daily contact with solid, unalterable facts and laws makes for sane thinking and right living, and gives an abiding confidence in the veracity of the world, which seems to be the speediest cure for popular delusions which an education exclusively literary would be unable to prevent.

DEFINITION AND SCOPE OF THE SCIENCE—Physical Geography, as the term is now used, is a very different science from that which was presented under the same name a quarter of a century ago. For the new science of Physical Geography there is a tendency among some writers to substitute the new term, Physiography, and there is probably some propriety in giving modern Physical Geography a distinctive name. At all events our science, in its widest sense, may include in its scope the whole material universe; but in a restricted sense it deals with the universe in its relations to man. Man is the central figure, and the relative importance of the various topics into which Physical Geography may be divided is to be measured by the extent to which the facts and phenomena under consideration exercise a determining influence on human activities and human progress. From this point of view, Physical Geography is the science which treats of man's physical environment. Compared with the older Physical Geography, it has less to do with Ethnology—with the characteristics which distinguish the races of men one from another—and more with what men of any race do and become under varying conditions of soil, climate and other surrounding circumstances. It deals less with astronomy and more with earth itself; less with the taxonomic, and more with the economic, phases of Zoology and Botany; less with the biological, and more with the physical aspects of the globe; less with air and sea, and

more with land. This modern Physical Geography considers the causes and consequences of physical environment, and does it with a degree of success which would have been impossible ten years ago. Environment reacts on the human organism in many notable ways, in some places presenting every stimulus and every opportunity for man's highest development, in others hedging him round with insurmountable limitations. Physical Geography, levying tribute upon the related science Geology, treats of the genesis of continents, mountains, interior plateaus, coastal plains and river valleys. It writes the history and development of the minor forms of surface relief. It tells of the origin of rocks and soils. It points out the physical causes which have influenced the present distribution of plants and animals. In a word it investigates as to character, cause and consequence, all the phenomena that affect man's relation to the globe on which he lives.

LAND FORMS—The subject of topographic forms will properly demand a large share of attention. The texts recommended in another part of this report describe fully the forms of surface relief, and the successive steps in land sculpturing from topographic youth to topographic age; and the teacher can scarcely do better than thoroughly to master the significance of the facts and carefully to follow the order and method of presentation he finds in these publications. The land forms of Iowa are not described specifically in any texts, but some information on this topic will be found in the reports of the National and State Geological Surveys. The subject, so far as it relates to Iowa, falls into two divisions:

I. The topography of the Driftless Area.

II. The topography of the Drift-covered Area.

The Driftless Area lies mostly in Wisconsin, but it embraces a small portion of Northeastern Iowa. The topography is mature. It has been developed by erosion of indurated rocks, and the varying hardness of these rocks has given rise to many interesting modifications of detail. The relief is much greater than in other parts of the state. A difference in altitude of six or seven hundred feet may be experienced in a few miles, and some of the river bluffs descend at a high angle, almost sheer, for three or four hundred feet. This whole topography has been developed by erosion of an uplifted peneplain. Entrenched meanders are a common feature of the river valleys.*

The Drift-covered Area presents a variety of land forms. In some instances the present surface configuration is controlled by the preglacial topography, but in general the surface features are dependent on the original construction or subsequent erosion of the

*On this whole subject, see article on *The Driftless Area*, Sixth Ann. Report, U. S. Geol. Sur.; *Pleistocene History of Northeastern Iowa*, Eleventh Ann. Report U. S. Geol. Sur.; Reports on Allamakee and Dubuque Counties, Iowa, Geol. Sur.; and *The Switzerland of Iowa* in *The Midland Monthly* for May, 1895.

drift. There are great differences in age between the sheets of drift occupying the surface in different parts of Iowa. Certain regions covered by later drift present a surface that is to-day in practically the condition in which the glaciers left it. The topography is young, wholly undeveloped; and its extreme youth is expressed in uneroded plains, absence of stream channels, and absence of river valleys. Young drift plains are seen in the Illinoian area around Mediapolis and Morning Sun; in the Iowan area they are well displayed in Buchanan, Bremer, Floyd, eastern Cerro Gordo, and generally throughout the counties of northeastern Iowa; and they are found best of all in the Wisconsin area, as, for example, in the counties of Hancock, Wright, Humboldt and all the others in the north-central part of the state. Youthful topography is also expressed in the anomalous topographic forms so well illustrated in the moraines of the Wisconsin drift. In morainic areas the surface is rough and hilly, but the inequalities are due to construction and not to erosion. Around the ice margin the drift was lawlessly heaped into irregular hills, with shapeless, ill-drained interspaces bearing no resemblance to dichotomously branched valleys of erosion. Morainic topography is seen in a belt, six or eight miles wide, north and south of Clear Lake. A number of pronounced morainic belts are found in Dickinson County, and here, as elsewhere, the lake basins of Iowa are features of the morainic topography.

The southern half of Iowa, west of the Illinoian margin, is occupied, superficially, by very old drift; the drift of the Kansan stage being the most conspicuous. In general, throughout this whole area, the surface is characterized by mature erosional topography cut in the drift. The relief is not very great, and yet there are valleys of erosion 150 to 200 feet in depth. The valleys are usually wide, and the slopes, back to the water-sheds between the larger streams, are all carved into a series of rounded ridges separated by a complex system of branching ravines. It is in southwestern Iowa that the effects of drift erosion are most pronounced. These effects are typically illustrated in the heavy drift of Ringgold, Taylor and Page counties.

The southern and western parts of Iowa, the parts lying outside the areas which were covered by the Iowan and Wisconsin ice sheets, have the older drift overlain by loess. The loess usually forms a thin veneer conforming to the inequalities produced by erosion before the process of loess deposition began; but in some places it attains a considerable thickness. The loess is soft; it cuts readily; and where thickest it develops a topography of its own of an exaggerated erosional type. Steep-sided gullies and irregular hills are among its prominent characteristics. Bordering the flood plain of the Missouri river, from Sioux City to the southwest corner of the state, there are steep, pointed, irregular hills and sharp crests of

loess mingled with eminences having more rounded, flowing outlines. It is probable that some of the peculiarities of the region may be due to the fact that the hills and ridges, in whole or in part, were, like snow drifts, heaped up by the wind. The loess here attains its maximum thickness, and erosion produces many fantastic effects.

Other land forms found within the glaciated area are known as Drumlins, Paha, Kames and Eskers. Kames and Eskers are best seen in Iowa in the area of the Wisconsin drift. The great Ocheyedan mound in Osceola county is an unusually fine example of a Kame.*

A study of the river valleys of Iowa reveals the interesting fact that streams differ very largely as to age. In the areas covered with Wisconsin and Iowan drift the streams are young. They flow in shallow channels, and their banks are on a level with the great drift plains which checkered with fields and dotted with farm houses, stretch away on either hand to the horizon. There are no valleys, no flood plains. Such a stream is shown in Figure 12, page 128, Iowa Geological Survey, Volume VII., and is described in the accompanying text. Compare this with the stream shown in Figure 10, page 104, Volume IV. of the same series of reports. The channel of the Mississippi river seems to be made up of old and new fragments pieced together. The valley is narrow at Dubuque, narrower still at LeClaire, and it expands to a width of eight miles at Burlington. During the Glacial Epoch the valley was the common meeting ground of glaciers coming from the northwest and from the northeast. Sometimes one set prevailed, sometimes the other; and the stream was shifted back and forth a number of times. In places the channel was choked with glacial detritus and was not recovered after the ice melted and disappeared. At two points along the eastern border of Iowa, the Mississippi is working at a comparatively new channel and doing its best to cut it down to grade. These points are the LeClaire and Keokuk rapids.

TEXTS—We have noticed with pleasure the advance of the last decade in the teaching of geography, as evidenced by the texts now in use in the grammar grades. No better preparation can anywhere be obtained for the study of physiography than that furnished by an intelligent use of Fry's, Redway and Hinman's, Tarr's or Dryer's geographies, to mention these admirable books in the order of their issue. Until recently the text books in Physical Geography have been wholly inadequate and have required revision by the teacher both by addition and by subtraction. Consisting of loose congeries of compends of all sciences, they have brought vexation to the teacher and tribulation to the pupil, and to their defects are due the objections made to the place of the study in the high school. To

*On the subject of Paha see *Pleistocene History of Northeastern Iowa*, by W. J. McGee, Eleventh Ann. Report. U. S. Geol. Sur.; on the subject of Kames and Eskers consult *The Great Ice Age*, by James Geikie.

your committee four recent text books in this science seem worthy of special commendation, those respectively by William Morris Davis, (Ginn & Co.); Charles R. Dryer (American Book Co.); Ralph S. Tarr (The Macmillan Co.); and Jaques W. Redway (Charles Scribners' Sons).

METHODS—Taking for granted that the recitation tests thoroughly the acquisition of the text, it remains for the teacher to clarify and crystallize the pupil's impressions, to illustrate, to awaken thought, to kindle interest, and to suggest pertinent problems for solution. A special advantage held by the earth sciences is that the laboratory of the fields and the open air is placed at the free disposal of all students. The example of the German schoolmaster, who makes the excursion an important part of his geographic instruction, is worthy of the closest following. The work of running water, the processes of rock decay and the formation of soils, the relations of plants and animals to station, the forms of clouds and all the phenomena of the weather are a few examples of topics best studied in the field. All accessible outcrops of rock and exposures of glacial drift will be examined, and a topographic map may be prepared showing the relief of the vicinity. On such excursions the passion of the collector need not be repressed, but the aim must be distinctly other than picking up specimens. Where Astronomy is not taught, many observations may be made most profitably of the place and movements of the members of the solar system, and in all concerning the planet or the life of man upon it, these can hardly be too thorough.

We recommend that laboratory work in the school room be given the largest possible place. Recent manuals suggest many details of such work, and no directions will here be needful.

APPARATUS.—We emphasize the fact that Physical Geography as well as Chemistry and Physics, requires a material equipment in order to be taught with the highest degree of success. New high school buildings, at least in our larger towns, should make provision for a physiographic laboratory. No indoors approach to the study of land forms is so direct as that by way of the relief map or model. Of extant models we place first the Harvard geographical series of three, issued by Ginn & Co., Boston, at \$12 net for the set. The forms of mountain and plain, of valley and shore which they illustrate, are too numerous to be mentioned here. Many of their lessons are so obvious that they may be used in the grammar grades, and some of the problems they present will test the ability of the most advanced pupils. They should be in every high school in Iowa where Physical Geography is scientifically taught.

We commend also the relief maps published under the direction of the U. S. Geological Survey, by E. E. Howell, of Washington. While the cost of these magnificent models may place them beyond

the reach of many of our high schools, their value in instruction each year will be found far in excess of the annual interest which might be reckoned on the investment. Of these we mention the relief maps of the United States, of different sizes, and ranging in price from \$25 to \$125; the Grand Canyon of the Colorado, with part of Utah (and, by way of comparison, the Yosemite canyon and the Niagara gorge on the same scale), \$125; Mount Shasta, a typical volcanic cone, \$40; and the Chattanooga District, illustrating peneplanation and the adjustment of rivers, \$65.

Cheap relief maps of the continents and of the United States, in which the vertical scale is grossly exaggerated, are caricatures which teach at least as much of error as of truth. In general, the educational value of a model, so far as the specific study of land forms is concerned, is in inverse ratio to the size of the area represented. It will sometimes be possible to enlist the help of students with special aptitudes in this direction, but such work, if thoroughly done, is so expensive in time that we cannot recommend it as a general exercise. This objection, however, does not apply to models made of dry sand, manipulated chiefly with funnels, since relief can be thus rendered with the minimum of time and with a fair degree of accuracy.

Topographic maps are so useful and so cheap that their absence in the high school may be taken to indicate something else than lack of funds. Those of our own country may be obtained from the Director of the United States Geological Survey, Washington, at five cents each, or two dollars per hundred, remittances being made by money order. Of these we recommend as of special use the Iowa sheets, and the atlas of ten sheets, with descriptive text, by Gannett, termed Folio 1, Physiographic Types, and costing twenty-five cents. An excellent list of selected maps is given in "*Government Maps of Use in Schools*," by Davis, King & Collie, Henry Holt & Co., New York, price thirty cents.

From the Mississippi River Commission, St. Louis, may be purchased at nominal rates several series of maps of that river, of which the most useful perhaps will be found the eight-sheet set showing the flood plain and the areas of overflow from Cairo to the Gulf. Daily weather maps will be obtained from the nearest publishing station of the United States Weather Bureau.

Many of the phenomena of physiography can be realized in the school room only by aid of the photograph or drawing. A collection of typical views is as necessary to the effective teaching of land forms as is a collection of fossils in historic geology. To present such views impressively to the entire class at once, so that each student may clearly see the smallest detail, requires apparatus for projection. A good lantern and a collection of slides may therefore be added to the list of the necessary equipment of a good physio-

graphic laboratory. The screen may be either a white wall of smooth surface, or a white curtain mounted upon a spring roller. The room may best be darkened by curtains of stiff, heavy and opaque material, running in slots made by screwing strips of wood to the window casings. The Heliopticon is specially commended, and an excellent instrument can be obtained at the McIntosh Stereopticon Co., Chicago, at moderate expense. Lantern slides cost from thirty to fifty cents each, and none but typical and well executed should be purchased. An excellent set of about one hundred, selected for the Cambridge, Massachusetts, schools, by Prof. W. M. Davis, is issued by E. E. Howell, Washington.

A word will perhaps suffice as to the necessary meteorological equipment. This should include a barometer, thermometer, psychrometer and rain gauge at the least. Many suggestions of value as to their use will be found in *Ward's Practical Exercises in Elementary Meteorology*, published by Ginn & Co., Boston.

BOOKS OF REFERENCE.—Books and magazines for collateral reading form a necessary part of the equipment, and full lists will be found in recent text-books. High school libraries in the state obtain the publications of the Iowa Geological Survey, gratis, by application to the Director, Des Moines, and in these will be found the fullest description of the physiographic phenomena of our own state. Duplicate copies of county reports may sometimes be obtained through members of the state legislature. Of magazines the *Journal of Geography*, Lancaster, Pa., \$1.50, will be found particularly useful. To this may be added the publications of the different geographic societies of America and the *Geographical Journal* of London.

SAMUEL CALVIN,
W. H. NORTON.

PHYSIOLOGY.

I. THINGS TO BE ACCOMPLISHED.

1. The pupil should acquire a knowledge of the general structure of the human body and of the functions of its various parts.
2. He should have sensible ideas regarding hygiene, both personal and public.
3. He should learn something of scientific method and acquire some degree of dexterity in experimentation.
4. He should be taught in the practical illustrative exercises to view nature at first hand, using microscope and other apparatus when necessary.
5. He should learn that the living body is a part of nature, and as such never transcends the operations of law; that law for the human mechanism is as inexorable as for the lowliest worm that crawls.

6. He should see that the human body is holy, to be revered; that a long life and a healthy body depend upon individual conduct and not upon physicians' prescriptions.

II. ORDER OF TREATMENT.

1. So many excellent text books are now available that it is hardly necessary to suggest more than the use of a text of recent date.

2. But any student in physiology should begin not too far afield from that which is commonly known.

III. METHODS OF STUDY.

1. The method of presentation should combine certain work of a practical character with text book study. This practical work should embrace the observation of physiological phenomena, experiments so simple that the pupil can readily make them, and dissections and demonstrations in anatomy.

The amount of dissection that may be performed in class illustrative of the text will depend somewhat upon public opinion and the tact of the teacher. Very profitable comparisons can be made between the anatomy of a rabbit or a cat and that of the human body. It will be found profitable in many instances to have the illustrative work in a topic precede the recitations. The teacher in some cases can prepare dissections and demonstrations of functions, when it would not be feasible for the entire class to perform the particular dissections. But as far as possible, the pupil should be responsible for each detail. The teacher should not allow the practical work to become an insignificant part of the study. Expensive apparatus is not only unnecessary, but is really out of place. Even the microscope should occupy but a minor sphere. The unaided eyes of the pupil will elicit nearly all of the information which can be assimilated at this period.

2 Each pupil should be required to make careful drawings of the dissections and accurate records of the experiments. The intimate relationships between the recitations and the illustrative work should never be lost sight of.

IV. TEXT AND REFERENCE BOOKS.

The following texts are adapted to high school classes: Blaisdell's Practical Physiology; Colton's Physiology, Experimental and Descriptive; Foster & Shore's Physiology for Beginners; Macy & Norris' Physiology for High Schools; Martin's Human Body, Briefer Course, revised by Fritz; Walker's Anatomy, Physiology and Hygiene.

In addition to the directions given in any of these text books, the teacher will be assisted in these practical exercises by the following: Foster & Langley's Practical Physiology; Gorham & Tower's Dissection of the Cat; Howell's Dissection of the Dog;

Peabody's Laboratory Exercises in Anatomy and Physiology;
 Sanford's Experimental Psychology; Stirling's Practical Physi-
 ology.

GILBERT L. HOUSER.

PHYSICS.

I. METHOD OF TREATMENT.

1. Physics is not to be considered as a series of disconnected subjects,—mechanics, sound, heat, light and electricity,—but, on the contrary, as a body of connected “well organized truth forming one great whole.” Consequently, its treatment should be continuous, causing one subject to follow another connectedly, the development being consecutive and natural.

2. The phenomena of physics are those of natural life. The fund of facts and illustrations is already in the possession of the pupil. The study should systematize and co-ordinate them and give the pupil an ability to use the knowledge acquired.

3. The use of the language of the algebra in the expression of physical relations should be exceedingly helpful if the notation is properly chosen. The algebraic question is “physical shorthand” and the symbols used should indicate their physical interpretation.

4. The development of physics has been almost wholly the result of observation and experiment. Any sound study of the subject, then, should include experiment,—laboratory work by the pupil.

5. Less than one full year is inadequate for the proper study of physics in secondary schools. The last year in the high school, if possible,—never earlier than the last but one,—should be assigned to the subject.* Four periods a week may be given to class work,—recitation and solution of problems, one and two-hour periods to laboratory work (or three periods may be given to recitation and two one-hour-and-a-half periods to laboratory work and solution of problems.) The following outline is arranged for the first division of the time. It may be easily adapted to the second by increasing the number of laboratory experiments and taking time from the laboratory periods for the solution of problems.

6. The class work should consist of recitation from the text-book † explanation and expansion of the more difficult matter by the instructor, and illustrations of the principal phenomena by means of apparatus at the lecture table.

7. The solution of problems by the pupil should be an im-

*See report of Committee on Unification of College Entrance Requirements, Iowa State Teachers' Association, 1898.

†The following text-books include quite fully the topics outlined: Crew—Elements of Physics (Macmillan); Carhart & Chute—Elements of Physics (Allyn & Bacon); Gage's Elements of Physics—Revised (Ginn, 1898); Hall & Bergen, A Text-Book of Physics (Holt); Avery—School Physics (Sheldon); Wentworth & Hill (Ginn); Rowland and A—— (American Book Co.)

portant part of the work. The questions in recitation and examination should be expressed in such a way that they become a test of the reasoning power of the pupil rather than a test of memory.

8. The laboratory work should be largely of a quantitative character, carried on under the direct supervision of the instructor. The pupil should have detailed instruction for carrying out each experiment. This may be accomplished by written instructions on the blackboard, on sheets, or by use of a laboratory manual.† The instructor should not attempt to teach more than thirty pupils in the class room or fifteen in the laboratory at one time.

9. Careful records should be kept by the pupil of the results of each experiment, and care should be exercised to see that these records are the results of the experiments and not statements transcribed from the text-book; and that the deductions follow logically from the data observed and are clearly and correctly stated. Great stress should be laid upon the quality rather than the quantity of the work, and care and accuracy encouraged. The experiments given in the list are those common to the best laboratory courses, and are sufficient for thirty-six periods of two hours each. The list may be extended indefinitely to suit the time and equipment.*

II. OUTLINE OF TOPICS.

Note:—Those topics marked * should be illustrated by experiments, % should be emphasized by problems.

1. *Introduction*—

- (1) Classification of subjects.
- (2) Properties of matter.
- (3) Conservation of matter.

2. *Units*—

- (1) Fundamental units.
- * % (2) The English and metric systems of units.
Relation between them (mass and length).
- * (3) Methods of measuring length, including vernier and micrometer.

3. *Pure motion (Kinematics)*.

- (1) Definitions of velocity, speed, acceleration for constant and variable motion.
- % (2) Uniform motion.

†Hall & Bergen—A Text-Book of Physics (Holt); Allen—Laboratory Physics; Hays, Lowry & Rishel—High School Laboratory Manual (Ginn); Gage—Physical Measurements (Ginn); Stone—Experimental Physics (Ginn); Chute—Physical Laboratory Manual (Heath & Co.)

*See Report of Committee of Ten, U. S. Bureau of Education, 1893.

See Report of Committee on College Entrance Requirements, N. E. A., July, 1899. School Review, Vol. VI., Jan., 1898; also Text-Books under last note.

- * % (3) Uniformly accelerated motion; development of formulæ; and special case of falling bodies.
 - (4) Circular motion.
 - * (5) Simple harmonic motion.
 - * % (6) Composition and resolution of motions. Graphical representation.
4. *Relation between force, mass and motion.*
- (1) Definition, names and comparison of units.
 - (2) Newton's Laws of Motion.
 - * % (3) General relation between force, mass and acceleration.
 - * % (4) Composition and resolution of forces.. Graphical representation. Include case of circular motion.
 - % (5) Gravitation, laws and cases.
 - * % (6) Center of mass, gravity and inertia.
 - * (7) Kinds of equilibrium; conditions for.
 - * % (8) Moment of a force.
5. *Work and energy.*
- * % (1) Definition and illustration of work, energy, power, potential and kinetic energy.
 - (2) Conservation and correlation of energy.
 - % (3) The units of work, energy and power. Relations between the units.
 - * % (4) Simple machines; laws of.
 - (5) The balance.
6. *The pendulum.*
- * (1) Definition of simple and compound pendulum.
 - % (2) Law of simple pendulum and its interpretation.
 - * (3) Application of pendulum to measure time, and "g".
7. *Mechanics of fluids.*
- * % (1) Laws of fluid pressure and application.
 - * (2) Compressibility.
 - * % (3) Atmospheric pressure, in pounds, grams, dynes and cms. of mercury.
 - * (4) Barometers, mercurial and aneroid.
 - * % (5) Relation between pressure and volume of gas.
 - * (6) Air pump and air pump experiments.
 - * (7) Principle of buoyancy.
 - % (8) Specific gravity.
 - * (9) Siphon and pumps.
8. *Capillarity and surface tension.*
- * (1) Phenomena described and illustrated.
 - % (2) Value of surface tension by rise in tubes.
9. *Elasticity.*
- % (1) Elasticity of form and of volume.
 - % (2) Coefficients of elasticity.

* (3) Elastic vibrations, transverse and longitudinal.

* (4) Waves; definition of terms; kind of motion.

10. *Sound.*

* (1) Nature of sound; condition of source; medium of transmission.

% (2) Propagation of sound. Interpretation of formulæ.

* (3) Reflection and refraction; resonance.

* (4) Properties of sound. Pitch, quality, intensity; interference and beats.

* (5) Musical scale and chords.

* (6) Vibration of strings; of air columns.

* (7) Method of studying sound vibrations graphically, and manometric flames.

11. *Heat.*

* (1) Definition of heat; sources; effects.

* % (2) Temperature and instruments for measuring temperature.

* (3) Distribution of heat; conduction; convection; radiation.

* % (4) Expansion and expansion coefficients.

* (5) Laws of change of state, and modifications.

* % (6) Calorimetry; unit quantity of heat; specific heat and latent heats.

(7) Thermodynamics; relation between units of heat and of work; the steam engine.

12. *Light.*

(1) The ether and the nature of radiation. Classification of ether waves and methods of detection.

% (2) Velocity and intensity of light; Photometry.

* % (3) Reflection and refraction; mirrors and lenses; index of refraction; total reflection.

* (4) Interference; diffraction; double refraction and polarization.

* (5) Dispersion; spectra and spectroscope. How used to determine substances.

* (6) Optical instruments; microscope, telescope, camera and projection lantern.

13. *Electro-statics.*

* (1) Fundamental phenomena.

* (2) Electrification and the electric field; conductors and dielectrics.

* (3) Electrification form of potential energy; how produced; how detected; kind.

(4) Potential and difference of potential.

* (5) Capacity and condensers.

* (6) Electro-static induction. The electroscope; distribution of charge.

* (7) Electro-phorous and electric machines.

14. *Current Electricity.*

- * (1) Fundamental phenomena including field of force about a magnet.
- * % (2) Electro-motive force, resistance, conductivity, strength of current and Ohms law.
- * % (3) Heating effect of current. Joule's laws.
- * (4) Galvanometers and measuring instruments.
- * (5) Voltaic and other primary cells.
- * (6) Electrolysis. Faraday's laws.
- * (7) Thermo-electricity.

15. *Magnetism and Electro-magnetism.*

- * (1) Definition and phenomena of magnetism.
- * (2) Force exerted between currents and between a current and a magnet. Ampere's theory of magnetism.
- * (3) Effect of magnetic substance placed in the magnetic field about a current.
- * (4) Electro-magnets and applications.
- * (5) Electro-magnetic induction; phenomena and laws.
- * (6) Electro-magnetic induction; applications, including induction coil, transformer, motor, dynamo and telephone.

III. LABORATORY EXPERIMENTS.

1. *Preliminary.*

- (1) a. Measurement of a length; use of a rule. Comparison of English and metric units of length.
- b. Measurement of lines of a right-triangle—estimate to 1-10 mm.
- c. Measurement of diameter and circumference of a circle and calculate value of π
- d. Determine the mass of 1 cc. water.

2. *Mechanics.*

- (1) Laws of uniformly accelerated motion (by ball rolling down inclined plane).
- (2) Density, by measurement and mass. English and metric.
- (3) Composition of forces. Three forces, not parallel, in the same plane.
- (4) Composition of forces. Three parallel forces in the same plane.
- (5) Composition of forces. Four forces at right angles in the same plane. Moments.
- (6) Work—the inclined plane. Coefficient of friction.
- (7) Law of simple pendulum. Determination of "g."
- (8) Laws of fluid pressure.
- (9) Specific gravity of heavy solids.
- (10) Specific gravity of solids lighter than water.

- (11) Specific gravity of liquids.
 - a. By specific gravity bottle.
 - b. By immersed solid.
 - c. By balancing columns. Hare's method.
- (12) Density of air.
- (13) Boyle's law. Compressibility of air.
- (14) Elasticity by stretching.
- (15) Elasticity by bending. Effect of varying loads and of varying dimensions.
- (16) Elasticity by twisting. Effect of varying loads and dimensions of rod.
- (17) Surface tension by rise in capillary tubes.

3. *Sound.*

- (1) Wave length of sound in air. Kundt's tube.

4. *Heat.*

- (1) Testing a mercury thermometer.
- (2) Linear expansion of a solid.
- (3) Specific heat of a solid—method of mixtures.
- (4) Latent heat of fusion.
- (5) Determination of dew point.
- (6) Latent heat of vaporization.
- (7) Heat by mechanical means.

5. *Light.*

- (1) Use of Rumford photometer.
- (2) Images in plain mirror.
- (3) Index of refraction of glass.
- (4) Focal length of converging lens.
 - a. With parallel light.
 - b. By conjugate foci.
- (5) Shape and size of images formed by lens—magnifying power.
 - a. Real image.
 - b. Virtual image.

6. *Magnetism and Electricity.*

- (1) Study of electrifications and electric induction with electroscope.
- (2) Field of force about a bar magnet.
- (3) Study of single fluid and a two fluid cell.
- (4) Study of lines of force about a coil carrying a current.
- (5) Study of electro-magnets; relations between directions of current and magnetic field.
- (6) Resistance of wires by substitution.
 - a. Single.
 - b. In series.
 - c. In multiple.
- (7) Resistance by Wheatstone's bridge.

IV. EQUIPMENT.

1. No school should undertake to give instruction in physics without a teacher well grounded in physical theory and well trained in experimental methods, and a suitably equipped laboratory. The successful instructor with the occasional aid of a willing mechanic, will arrange much simple and inexpensive apparatus*, yet it is necessary to guard against the waste of time and lack of results that attend the use of ill-constructed and inferior instruments.

2. No laboratory equipment is complete without a work-room fitted with a vise and bench tools, a few wood-working tools, a lathe and a supply of materials such as sheet metals, wire, rods, hard rubber, wood, nails, screws, etc. This equipment is practically indispensable.

3. In addition to the references already made, the teacher will find the following books full of suggestion:

Gage: Principles of Physics (Ginn & Co.)

Carhart: University Physics (Allyn & Bacon).

Watson: A Text-book of Physics (Longmans, Green & Co.)

Daniels: Principles of Physics (Macmillan)

Barker: Physics (Holt)

Hastings & Beach: General Physics (Ginn & Co.)

Ames: Theory of Physics (American Book Co.)

Stewart: Heat, Elementary Treatise (Macmillan).

Thompson: S. P. Elementary Lessons in Electricity and Magnetism (Macmillan).

Perkins: Electricity and Magnetism (Holt & Co.)

FRANK F. ALMY.

* For suggestions see:

Hall & Bergen—A Text-book of Physics (Holt).

Allen—Laboratory Physics, *Teachers' Edition* (Holt).

Chute—Practical Physics.

For Physical Apparatus:

Franklin Educational Co., Boston.

Queen & Co., Philadelphia, Pa.

E. S. Ritchie & Sons, Brookline, Mass.

A. L. Robbins & Co., Chicago.

Chicago Laboratory Supply Scale Co., Chicago.

For Glass and Chemicals:

Richards & Co., 108 Lake St., Chicago.

E. H. Seargent & Co., 106-108 Wabash Ave., Chicago.

Part III.

The Committee urges provision for the subjects outlined in Part II in the program of studies of every high school. The fundamental character of the subjects there mentioned commends them as desirable for at least a large portion of the high school graduates, while it is taken for granted that such subjects as Mathematics, English, History, Civics, Physics and Latin will be provided for in every curriculum. The Committee adopts the method of using the term "program of studies" for everything provided for in the high school, whatever may be the course; the term "curriculum" for the scheme of studies leading to graduation in any given course; thus, Chemistry might be in the "program of studies" *as belonging to the scientific course*, but would not be in the *curriculum* of the Classical or Latin course.

A sufficient number of studies from the following list should be placed in each curriculum to make the full requirements of the High School course.

ARITHMETIC.

As the course is arranged, the pupil in the high school comes to his review of Arithmetic with a knowledge gained from the study of the branch in the grades, which should enable him to perform all the ordinary operations of any part of the Arithmetic understandingly and with a fair degree of accuracy and rapidity. His course in the high school has so advanced and grounded him in the use of text-books that the method which employs lines, blocks and other objective illustrations in teaching the subject has no educational value for him and hence should not be employed. He has had in his high school course one year of Algebra and in most cases a year of Geometry, which should enable him to reason clearly and to exercise his mind upon the more difficult problems and in abstract parts without distraction. It should also be noted that there are two distinct things to be acquired by the study of Arithmetic, viz., ability to perform the necessary operations accurately and rapidly and the knowledge of what operations must be performed. The former of these can be gained only by persistently drilling upon the operation and requires little thought. The second requires a process of reasoning, based upon definitions and principles and can never be success-

fully learned by performing the operations in arithmetic nor by solving the problems.

With these points in view, we would make the following suggestions:

1. The mastery of the simple operations in integers, decimals and fractions can be accomplished by drills arranged for work independent of problems. In arranging these drills they should be of two classes: those where the results are to be given at sight and those in which an analysis form is coupled with the work. The first class may be employed in simple integers and decimals, the least common multiple, simple reduction and operations in fractions. and the direct or simple cases in percentage.

The second class will cover drills in the greatest common divisor, comparison of integers with fractions, secondary steps in percentage and evolution.

To illustrate: 7 is $\frac{3}{4}$ of what? 11 is $\frac{4}{5}$ of what? etc. The form should be: "7 is $\frac{3}{4}$ of, $7 \div \frac{3}{4}$ or $9\frac{1}{3}$, 11 is $\frac{4}{5}$ of, $11 \div \frac{4}{5}$ or $13\frac{3}{4}$." With such questions as $\frac{2}{3}$ of 13 is $\frac{2}{5}$ of what? $\frac{3}{5}$ of 17 is $\frac{2}{3}$ of what? etc., the form of analysis should be: " $\frac{2}{3}$ of 13 is $\frac{2}{5}$ of, $\frac{2}{3}$ of $13 \div \frac{2}{5}$ or $\frac{5}{3}$ of 13, which is $21\frac{2}{3}$; $\frac{3}{5}$ of 17 is $\frac{2}{3}$ of, $\frac{3}{5}$ of $17 \div \frac{2}{3}$ or $\frac{9}{10}$ of 17, which is $15\frac{3}{10}$."

It will be observed that in all such work the fraction becomes a unit in the reasoning and is not segregated, as is nearly always done. It also makes use in the analysis of the identical language of problems which the pupil will meet in his subsequent work.

From these illustrations concise forms can easily be arranged for the drills in percentage.

2. A thorough mastery of all of the signs used in arithmetic is essential to the best cultivation of thought in the teaching of arithmetic. The drills in this should be of such a nature that after completing the drills the pupil will be able to complete all classes of indicated work with a certainty of having it correct. He should know the exact force or meaning of each sign and just how far its force extends.

3. In reviewing the four fundamental operations, addition, subtraction, multiplication and division observe that subtraction is the reverse of addition, and division the reverse of multiplication, and hence in all of the work in arithmetic there can be but four classes of elements, viz: addends and sums or products and factors. This at once circumscribes the number of possible operations in any subject. Thus in percentage the work is all based on products and factors, in mensuration the same, and in common fractions each of the four classes is found. Much drill should be given in simply determining which class of arithmetic element each number, given in the problem, represents. To do this the pupil must ravel the problem and form his conclusions from the inter-relations as expressed by the words of the problem.

4. Following this last drill, and very closely allied to it, is another which aids very greatly in the development of independent thought upon the part of the pupil. All problems from those in the fundamentals to the most complicated, should be read into statements giving the necessary operations for the solution. These should be in the form of an equation whose right hand number is *the name of the result* and *not* the result. These separate equations will be the successive steps necessary in the solution.

To illustrate: A man bought 225 acres of land at \$15 and sold the whole of it for \$3,125. How much did he lose?

STATEMENTS.

Fifteen dollars multiplied by two hundred and twenty-five equals the cost of the land.

Fifteen dollars multiplied by two hundred twenty-five minus thirty-one hundred twenty-five dollars equals the amount he lost.

THE SOLUTION.

$\$15 \times 225$ equals the cost of the land.

$\$15 \times 225$ equals \$3,125 which equals the amount he gained.

Again, a man paid $\frac{2}{3}$ of his money for improvements upon his house and $\frac{1}{3}$ of it for machinery and implements. If he still had \$960 left, how much had he at first?

STATEMENTS.

Two-fifths plus one-third equals the part of his money expended. One minus the vinculum two-fifths plus one-third equals the part of his money he has left.

Nine hundred sixty dollars divided by the parenthesis, one minus the vinculum two-fifths plus one-third equals what he had at first.

SOLUTION.

$\frac{2}{3} + \frac{1}{3}$ equals the part of his money which he spent.

$1 - \frac{2}{3} + \frac{1}{3}$ equals the part of his money he has left.

$\$960 \div (1 - \frac{2}{3} + \frac{1}{3})$ equals the amount he had at first.

It will be seen that this work in its final statement shows the numbers of the problem in all their inter-relations.

5. Much attention should be given to the synthesis of problems from indicated statements.

To illustrate:

1. $\$1,150 - (\$9 \times 150 - 25)$ equals the amount he lost on stock.

2. $7.5 \text{ gal.} \times 2 \times .7854 \times 3$ equals the number of gallons the can will hold.

3. $\$205\frac{4}{5} \div \frac{2}{3} \text{ of } 4 \times \frac{3}{4} \text{ of } 2$ equals the value of $\frac{3}{4}$ of 2 acres.

4. $\$9600 \div .40 \div .60$ equals the value of the whole mill.

PROBLEMS.

1. A man paid \$1150 for 150 head of young stock, 25 of them died and he sold the balance at \$9 per head. How much did he lose?

2. How many gallons will a can hold which is 2 feet in diameter and 3 feet deep?

3. If $\frac{2}{5}$ of 4 acres of land be sold for \$205 $\frac{1}{2}$, at the same rate, what is the value of $\frac{3}{4}$ of 2 acres?

A man owning 60% of a mill sold 40% of his share for \$9600. At the same rate what is the value of the whole mill?

Also form problems requiring simple given operations. Thus, 1. Form a problem which in the solution requires the square root of the sum of two numbers. 2. One which requires the square root of the sum of the squares of two numbers. 3. One which requires the dividing by one plus a rate expressed decimally. 4. One which requires the multiplying by a fraction. 5. One which requires the dividing of a number by a compound fraction.

6. Arithmetic is most decidedly a deductive science and as such the reasoning is based upon definitions, axioms and principles. These are, as it were, the measuring sticks by means of which the pupil is to do his work, hence, to fail to have him well grounded in these is to turn him out a cripple. Insist upon having definitions and principles contain all that they should contain and then have them committed verbatim. Far more trouble arises from having inductively lead up to a process with no language or with poor language to describe it than from what is so glibly called a crowned memory. A definition in arithmetic to be complete should tell not only what a thing is, but also what it is arithmetically. This last element in the definition will give its relation to other things with which it must be considered.

7. Let all processes and methods of operations be determined by the definitions, the principles, and when they are to be applied. This manner of procedure will very materially change the commonly accepted process. The most practical application of the G. C. D. is in reducing fractions and for that purpose the common processes are of no value. Also with the L. C. M. Involution, when presented in the light of the fact that it is the forerunner of the roots, will be presented in processes which will enable the pupil to reverse the order of the processes and thereby master the roots with much greater ease.

A. W. RICH.

ASTRONOMY.

In the consideration of suitable scientific branches for high school courses it is necessary to bear in mind the limited equipment of the schools, and the mental capacity of the students. The study of astronomy is eminently adapted to the requirements of the small high school, as it may be pursued with advantage with almost no outlay for apparatus, and a very good elementary knowledge of the subject may be acquired by the student of average ability at quite an early age. Astronomy is a subject which appeals to the mind of the young for the reason that its phenomena are of daily occurrence, and force themselves upon the atten-

tion of even the most casual observer. That astronomy is essentially a natural science study is shown by its being the oldest of our sciences, its profoundly mathematical aspect being of comparatively modern development.

The professional value of a study is not the only point to be considered in determining its fitness for the high school curriculum. On the other hand, we have passed beyond the time when even the laboring man should limit his knowledge to the "Three R's," and the high school fails in its most important duty when it fails to train its students to observe the world about them.

It is not usually necessary for the teacher to awaken keen enthusiasm in the study of astronomy, as it often is in the case of chemistry, or of physics, for the average student has from childhood felt an almost reverential interest in "those shining orbs that bespangle the dark robe of night." Consequently, astronomical facts fall upon eagerly receptive minds, and the student's powers of observation are trained almost without his realizing that he is applying himself to a serious study.

In the teaching of this, or of any other science, the true teacher will seize upon the opportunities offered to stimulate the inventive genius of his students, by requiring them, with but little assistance, to make simple apparatus by which they may determine roughly many fundamental facts—in this case those that are connected with the local latitude and longitude of the student's home. The student may, in effect, be asked this question: What facts regarding your position upon the earth's surface can you determine by the use of apparatus made by yourself? Let him make the apparatus and demonstrate these facts. By such methods he may be trained not only in the invention of his own ways and means of research, but also in the use of simple tools and appliances. His interest will be stimulated by a brief historical study of the subject, in which special attention is called to the development of simple astronomical apparatus by early workers in this line. Some very practical suggestions for the student's help in the arrangement and use of simple devices, and also in locating important lines, circles and directions, may be found in David P. Todd's "A New Astronomy," published by the American Book Co.

The interest of the average high school student in Astronomy may be greatly increased by the devotion of a number of evenings to the identification of some of the prominent constellations. For this purpose he should have access to a small star atlas, such as R. A. Proctor's "Half Hours with the Stars," published by W. H. Allen & Co., 13 Waterloo Place, London. We would recommend that not only evenings when there is no moon, but also evenings when there is considerable moonlight be chosen for this work, as the starry heavens are radically different in appearance at such

times. It is not necessary that the student identify more than a few of the very prominent constellations.

The method of obtaining exact time, and the relations between the various kinds of time should be carefully considered. Attention should be called to the importance of uniform standards of time and to the necessities which have led to the division of the country into a few time belts. In the study of the planets the student should be asked to locate by his own observation all those that are visible during the time that he is engaged in astronomical study, it having been explained to him that the planets show a steady and not scintillating light, that they are close to the plane of the ecliptic, and that by careful observation their movement may be noted in the course of a few days. Attention should be called particularly to astronomical units, stress being laid upon the necessity of using units in terms of which all magnitudes may be expressed by rather small numbers, large numbers being in general quite meaningless to the student. Thus terrestrial dimensions may be given in miles; while the moon's distance is preferably expressed in terms of the earth's radius. The mean distance of the sun is a convenient unit with which to measure all planetary distances, while "light years" are needed to reduce the incomprehensible stellar distances to our ordinary numerical conception.

For help in identifying constellations, and also for use in the classroom, the diameter of the moon's disc should be kept in mind as about one-half of a degree, while the distance between the "pointers" of the "Dipper" is about five degrees, and one side of the great "Square of Pegasus" about eleven degrees. In connection with the latter constellation it may be noted that the east side of this square lies in the Equinoctial Colture, thus enabling the student to form some definite conception of the position of the Vernal Equinox. By means of such facts as the above the student will acquire concrete ideas of the angular distance, separating stellar bodies, and of the dimensions of figures upon the celestial sphere. Without these ideas. many of the fundamental notions of the science must be vague and unintelligible to the student and their statement a mere memory exercise.

L. G. WELD.

BUSINESS TRAINING.

This is a commercial age and the educators of to-day are faced with a condition, not a theory. This condition demands that the public schools prepare young people for the necessity of the hour, which is a thorough technical and commercial education. It is also true that this is an age of specialists, and the expert or the

specialist in commercial, professional and public affairs is everywhere in demand.

Investigation has shown that the thorough business and technical training provided by the public schools of Germany has had an intimate relation to her high and enviable position in the world's commerce. The German government has for many years maintained, at public expense, free commercial high schools and free technical schools, and in spite of the natural physical disadvantages of the country, the German government and the German people are to-day reaping the benefits of a liberal education.

A man who is known to the world as a successful business man and author says, "I can with confidence recommend the business career as one in which there is abundant room for the exercise of man's highest powers and of every good quality in human nature. I believe the career of the great merchant or banker or captain of industry to be favorable to the development of the powers of the mind and to the ripening of the judgment upon a wide range of general subjects, to the freedom from prejudice and the keeping of an open mind."

In addition to the pecuniary advantage to the student, there is a great public benefit which will result from the teaching of business branches in the public schools. If all the accounts of the public officials were kept by competent bookkeepers and the public officials themselves were familiar with business customs, there would certainly be a great saving to the taxpayers, and the morals of public offices would rise several degrees in the scale. The student of bookkeeping sees in every transaction the nice balancing of values in his debits and credits. He learns in a practical way that nothing of value is acquired without an outlay of its equivalent in some form. The mental training thus derived from the constant balancing of values received with values given out is second to none furnished by the public schools. So the study of bookkeeping and business methods commends itself as a means of practical, moral and intellectual training. Practical, because it fits one for success in business, professional and public life; moral, because it reduces the chance and temptation for profligate or fraudulent use of private and public money. Intellectual, because it broadens and trains the mind on a wide range of subjects.

A business course can scarcely be called such unless it include short-hand and typewriting. The average business man of to-day has no time to devote to the training of stenographers, book-keepers and other office assistants, and the young man or woman with a knowledge of business forms, business transactions, and customs has a great advantage over the one who lacks such knowledge. A few years ago young men were taken into an office and trained to do the general work of that office and were called office clerks. Now the trained stenographer has almost wholly superseded the office clerk.

For this reason the young men and women are leaving the public schools early and attending the business colleges in order to prepare for this work.

In the interest of a general education I believe it is the duty of the public schools, wherever it is possible, to provide a course in commercial geography, book-keeping, shorthand and typewriting. If general intelligence is the bulwark of our liberties and welfare, let us throw out this inducement to keep our young people in the public schools, where they may attain a broader, more liberal education than they now receive.

Shorthand commends itself as a high school study because of the mind and hand training that it provides. All the principles employed in this scientific art are governed by definite rules. The correct application of each rule trains the mind to discern and apply principles in rapid succession. This not only develops judgment, but activity of thought and executive volition. There is no study in the high school course that so constantly compels the correct use of English as does shorthand and typewriting. Every transcript is a lesson in English, punctuation and spelling. The typewriter is probably the best censor in the school because it shows to the pupil clearly and impartially, privately first, then in full view of the public, all his little weaknesses in the use of English.

Dr. Taylor says: "The three elements necessary to success are accuracy, speed and comprehensiveness. The student must learn not only the theory, but must be accurate in the application of the theory. But this will be of little practical use unless he be able to command accuracy with speed. A person who can do a given amount of work in one day is worth twice as much as one who requires two days for the task, and three times as much as one who requires three days, etc. In this commercial age we have learned to value people for what they can *accomplish*—not according to what they may *know how* to do. By *comprehensiveness* in this connection is meant the knowing of what each occasion demands or the power to grasp the situation and make the most of it, instead of doing each individual thing as commanded. Teach the pupil to *see things*, and to turn his knowledge, ability and tact to the accomplishment of a purpose.

The first matter of importance in the teaching of book-keeping is the selection of a good modern text—one that treats of up-to-date methods, gives due attention to penmanship and the writing out and filing of such business and legal documents as are called for in ordinary business transactions. The saving of a few cents should not influence school authorities toward the selection of a text that deals with antiquated methods and practices that are never used outside of the school room.

1. Put into the hands of the pupils a model daybook journal and have them make a neat and correct copy of it. Show them the

relations existing between the day book record and the journal entry. Show them that the day book record is a history of the transaction and that the journal entry is the same, arranged briefly as debits and credits for convenience of posting.

2. Now show them a model ledger with the same transactions carried from the journal, i. e., posted into accounts. Teach them the nature and object of these accounts, and the characteristics of the various accounts showing how they are affected by the business transactions. Trace the transactions from the journal to the ledger making the pupils understand how, when and why, these accounts are debited and credited.

3. Have the pupils post the transactions from their day book journals into their ledgers correctly and systematically one day's transactions after another giving careful attention to form and penmanship.

4. Pencil-foot the accounts in the model ledger and list them, i. e., take a trial balance, teaching the nature and object of the same. Then have the pupils take a trial balance to prove the correctness of their work. See that all this is done in a neat and business like manner. Have the work written as many times as may be necessary to get a well written copy devoid of errors.

5. Now review the work and lead the pupils to see why the sides of a trial balance are equal. Show them that in the journal each debit has an equal credit and that therefore the total debits and total credits in the journal are equal. These debits and credits being carried to their respective sides in the ledger, that book must balance. Therefore, the trial balance is used to prove the correctness of the work.

6. Next have the pupils carry on business transactions, writing out the various papers necessary and using representative currency, and cards to represent the merchandise bought and sold. When the pupil has completed each transaction and understands it, have him make a neat record of it in his day book journal, making such a record as would enable any one to learn by reading it just what the transaction was. These transactions should be so graded that each one will give the pupils a broader insight into the science of accounts.

7. After a sufficient number of transactions to make a good showing have been recorded, say thirty or forty, have the pupils post them and take a trial balance.

8. Have them take an inventory of stock on hand.

9. Teach them the nature and purpose of a balance sheet, when and how to make it, then have one taken of their work.

10. Have all accounts showing loss or gain closed and make the proprietors account show the net loss or gain and present capital.

When the subject has been taught in this way the pupil will see

the gradual unfolding of the science, and if the transactions have been made clear by the use of business papers, such as are used in actual business transactions, the study becomes not only profitable, but interesting and fascinating to the pupil.

CLAY D. SLINKER.

(NOTE:—This chapter was overlooked until late, hence was not subjected to the method of criticism applied to the others, and was not read and approved by the committee as a whole. We suspect that members of the committee might dissent from Mr. Slinker's plea for stenography in the high school, though all would approve his excellent practical suggestions at the close the chapter.—CHAIRMAN.)

CHEMISTRY.

Perhaps in no other subject of the school curriculum is there such wide diversity in the nature and method of the introductory courses offered as in chemistry. Leaving out of account the inferior intrinsic value of certain varieties of courses, the want of uniformity is unfortunate for two reasons. First:—Almost any school with continuity of ideal or policy could soon accumulate the requisite laboratory facilities for a good course, but this is hardly practicable if the nature of the work, and therefore, the character of the apparatus demanded, is changed with the incoming of every new teacher. Second:—Without at least a fair degree of uniformity in the courses in the secondary schools, the colleges and universities cannot offer courses specially adapted to those who have taken chemistry in the high schools.

This paper has reference to only one type of course in elementary chemistry. It is the sort of course that is approved and taught by the great majority of able teachers and students of the pedagogy of chemistry and it consists, briefly stated, of recitations or lectures on general chemistry, with parallel and distinctly related laboratory work.

TIME DEVOTED TO CHEMISTRY. To cover the ground of elementary chemistry as a science requires at least a three-hour course extending throughout the year. A five-hour course would be better. If so much time cannot be given to the subject, it would be better to confine the work mostly to the so-called non-metals, since this will suffice for the development of the elements of the theory, rather than to attempt to study all the common elements in detail.

PROPORTION OF LABORATORY WORK. With a good equipment nearly or quite one-half of the time should be devoted to laboratory work. More time can be given to make clear the significance of the work by individual instruction at the pupil's desk. All laboratory work without a clear idea of its relation to chemical principles is just as bad as all text-book.

CHARACTER OF LABORATORY WORK. The chief value of laboratory work consists in manual training, in the exercise of judgment in applying means to ends and, most important of all, in its

bearing upon scientific facts and principles. It is evident, therefore, that good experiments should not be too simple nor yet beyond the powers of the pupil, and they should bring out facts and suggest principles. An experiment which brings to light several facts and has a direct bearing upon a principle is to be preferred to one that brings out only an isolated fact. A few experiments of the first importance, done with thoroughness and care, are of more value than many experiments of minor importance, done with haste and carelessly.

In general, the standard experiments relating to the preparation and properties of the non-metallic elements and their compounds are of more importance to the beginner than precipitating compounds of the metals, blowpiping or testing in other ways. A few simple quantitative experiments should be included in every course, but if too many or too difficult they are likely to produce failure and discouragement.

LENGTH OF LABORATORY PERIODS. The laboratory period should be at least twice the length of a recitation period. It is surprising to find that in some of the best high schools the laboratory periods are only forty minutes in length. In many cases it is almost absolutely necessary that the pupil should perform without interruption a group of closely related experiments such as in the preparation and study of the properties of oxygen, chlorine, ammonia, and this cannot be done in forty minutes. Again, many of the most valuable experiments in both chemistry and physics demand more than that amount of time. In a large high school the author recently asked the instructor how he managed to have his pupils do certain experiments within the prescribed period, and the answer was, "We have the apparatus all ready set up for them at the beginning of the period." In other words the pupil merely pressed the button. Is that teaching science?

THE INDUCTIVE METHOD. It is probably neither practicable nor desirable to carry out in the strictest sense the inductive method in teaching chemistry. Most pupils have neither the ability nor the time to re-discover the science of chemistry. The presence of the descriptive text-book makes it impracticable to pursue a strictly inductive plan. Nevertheless, the spirit of the course should be inductive. By this is meant facts first and then principles and theories as the logical inferences from facts.

The laboratory work upon any topic should *precede* the recitation or lecture upon the same topic. The experiments should be discussed in the recitation-room after the laboratory work has been done, and the facts they teach should be made clear. Other experiments should be performed by the teacher and their significance made plain. Around the facts brought out by the experiments should be grouped other related facts, and then

principles and theories may in the true inductive spirit be discussed in the light of these facts.

THE ORDER OF STUDY. Unfortunately that part of general chemistry offering most difficulty, both in the laboratory and in the recitation-room must come near the beginning of the course; that is the non-metallic elements, where are met most of the gaseous elements and compounds. It is very desirable that the elements of theory be introduced near the beginning of the course, and for the consideration of theory a knowledge of the compositions and reactions of gases by volume is essential. For this reason a good order of study is, oxygen, hydrogen, chlorine, bromine, iodine, nitrogen and their compounds, and air. A little theory may then be introduced, after which the non-metallic elements may be taken up, so far as practicable, in groups, as they occur in the periodic arrangement. This arrangement is probably not final, but it is practically of great advantage to study nearly related elements together instead of in the purely artificial order as they occur in the analytical groups. Leaving out the above elements as already studied, perhaps the groups whose elements are most important in the study of chemical theory are in order, VI, V, IV, III, I, II, VIII, VII.

CHEMICAL THEORY. Chemical theory is difficult, but it may be made far easier for the pupil if introduced as he is prepared for it and it is skillfully presented. Only a knowledge of chemical facts can prepare the pupil for the comprehension of the theory. The common practice of the text-books in presenting a mass of theory at the very beginning, including atomic and molecular weights, formulae, valence cannot be too strongly condemned. This is seemingly done in order that reactions may be represented by equations of formulae, which seems to be the end and goal of chemical study in the minds of some text-book writers and teachers.

The foundation of chemical theory as regards atoms, molecules and reactions is proportion by weight and by volume. The logical procedure in the earlier part of the course is, therefore, to represent reactions by weight, and by volume if gases are concerned. The laws of definite and multiple proportions naturally and even inevitably come to the fore, and these lead naturally to the ideas of atom and molecule. The ideas of atoms and molecules may be presented as soon as oxygen and hydrogen and their compounds have been studied. After the study of chlorine, bromine, nitrogen and their compounds, these ideas may be brought up again and enlarged upon. At this point proportions by weight and by volume may be translated into formulae and these may be used in a tentative way. About the middle of the course may be introduced, in an elementary way, the determination of atomic and molecular weights, and the calculation of formulae.

In short, the theory should be presented in small amounts as the pupils are ready for it, and each time that which has been previously presented should be reviewed.

One of the greatest evils in the teaching of elementary chemistry is the misuse of formulae and equations. They are merely the receptacles of truth, or forms of expressing truth inferred from experiments and not means of discovering truth. The teacher is often asked to give rules for writing equations. Manifestly in the very nature of the case there can be no such rules, since equations merely represent reactions that take place. With a knowledge of a part of a reaction, related reactions and valence, the remainder of the reaction may, with much probability, be inferred, but the result of such inference is never certain until proved by experiment.

LABORATORY MANAGEMENT. It is not advisable to undertake the study of chemistry in a high school without some facilities for laboratory work by students. A beginning may be made with a few essentials and a prospect of increasing the equipment. With a consistent purpose, care of apparatus and judicious small expenditures each year, a good working equipment is soon accumulated.

The first requisites for good laboratory work are sufficient space and desk room for individual students. The apparatus should be sufficient in quality and quantity, every student should have his own and should be held responsible for it. There should be no such thing as two students working together upon the same experiment at the same time.

The chemicals and apparatus absolutely necessary to good laboratory work are not expensive. Fortunately schools may import, through American dealers, chemicals and apparatus duty free or at prices only a little more than half those paid at home. Importers are willing to handle orders of \$100 or even less.

In purchasing supplies two mistakes are very commonly made. The first is the purchase of a few expensive pieces for the teacher to use before the class instead of getting a large number of simpler things for the same amount of money, suitable for the use of students. It is not at all uncommon to find in a high school laboratory half a dozen show pieces of physical apparatus which cost enough money, had it been judiciously expended, to fit up very fairly a physical laboratory for a dozen pupils doing elementary work. The second mistake applies chiefly to chemistry, and is that of buying chemically pure chemicals for almost everything. Such chemicals cost as a rule three or four times as much as the ordinary commercial chemicals, which in nine cases in ten are just as good as the chemically pure. Another extravagance is the purchase of Bohemian glassware which costs twice as much as the modern German ware which for most purposes is just as good.

Everything connected with the laboratory should be reduced to system. All chemicals and apparatus needed in any laboratory period should be provided beforehand. Failure at one or two points may throw the whole class into confusion. Work of the initiated should not be committed to wholly inexperienced hands. For example, hard glass tubing should be worked into the necessary forms beforehand by the teacher. Only the experienced can quickly and surely bore cork stoppers and set up gas-tight apparatus with them. Endless annoyance and failure are spared by using rubber stoppers, counting waste of corks, rubber stoppers are cheaper.

Shelf reagents and other solutions for students' use should never be made up by guess, but by following a definite system of concentrations that experience has proved good.

LABORATORY TEACHING. The printed or written directions for the experimental work should be clear and explicit, and even then it is best to supplement the directions and illustrate difficult points in the work before the pupils enter the laboratory. The efficient teacher will take such occasions to make necessary changes in the directions, if they are not his own, to suit his own environment. On such occasions apparatus at all complicated should be set up before the class, and it is well to place it in the laboratory as a model.

While good laboratory work is indispensable in the proper study of chemistry, it cannot be too strongly urged that even a well selected course of experiments may be so done as to result in little more than inferior manual training. The teacher must ever be on the alert to prevent pupils from falling into mechanical and slovenly habits of work. Nothing but persistent questioning and suggestion will prevent the former, and nothing but unsparing criticism with suggestions having the force of commands will prevent the latter. The common idea that any apparatus that "will work" is good enough should not be tolerated. The teacher should unhesitatingly require the pupil to reconstruct any piece of apparatus not properly set up and to readjust it until it is right. An experiment performed with only partial success should be repeated until proper results are obtained. It should not be expected that all experiments will be successful the first time they are tried by inexperienced hands. With rare exception the teacher should resist the temptation to help the pupil out of a difficulty with his own hands, and should confine his aid to suggestions.

NOTE-TAKING. The laboratory note-book should contain a faithful record of the student's work, including a description of the apparatus, a statement of the chemicals used, conditions, results and any inferences that may legitimately be drawn. The notes should be written as the experiments are performed and never copied. Only those notes that are original records are of value. Such note books with their poor penmanship and stains made by chemicals do not look so well as the elaborated, faultless copies

made at home, but that fact is not to be considered when we remember that such copied notes lose their value as records.

The teachers should beware of the note books sold by publishers and having such headings as "Requirements," "Conditions," "Observations," "Conclusions," followed by blanks for the student to fill in. Do not quench any spark of originality the pupil may have by any such stereotyped artifices. The notes should read as records of work done, and should be in the most accurate and concise language. They should be self-explanatory and not require the laboratory hand-book for their interpretation. Beyond requiring proper arrangement, title of the experiment, paragraphing and placing numbers to be compared in the same vertical column, the individuality of the pupil may be allowed to assert itself. Outline drawings of apparatus should be specially encouraged.

THE TEACHER. A man of first rate ability, bright, energetic and resourceful, may teach chemistry well in a high school though he has taken only one full year course in the science in a college or university, but two or three years of preparation are very much better. It is only the exceptional man who can do good work with one year's preparation, and one who has had good training in related sciences, such as physics.

The author wishes to make a plea against the over-burdening of the science teacher. To conduct the recitations in chemistry or physics, manage the laboratory, prepare apparatus and chemicals, and do the laboratory teaching demands an amount of time and energy equivalent to that required by two or three classes in other subjects. Until this fact is recognized, work of the same degree of excellence as that done in the languages and mathematics need not be expected in chemistry and physics. The conscientious teacher who is overburdened by classes in other subjects may do his science work well for a time by overwork, but in the majority of cases he will leave the profession for some other occupation or perforce fall into easier and inferior methods of conducting his science teaching.

To build up a good science laboratory it is necessary to have continuity of plan and purpose, and it is hardly necessary to say that it is, therefore, very important that a good science teacher once secured should be retained if possible through a series of years.

TEXT*AND REFERENCE BOOKS. Most teachers prefer to use a text-book and in general this may be advisable, though there are those who believe that the very well prepared teacher who is something of an artist in his work may do better if free from the restrictions inseparable from the use of a text-book. Anyone selecting a text-book for the class room should choose that one having in the greatest degree these characters.

(1) The book should cover the ground of the common elements and chemical theory in an elementary way.

(2) It should have the true inductive spirit. By this is meant not only that the pupil should be led to draw inferences from his laboratory work, but also, that the ground for all fundamental conceptions in chemical theory should be made clear.

(3) The laboratory work should be practicable and well chosen, and the cuts to illustrate it should represent present day forms of apparatus instead of forms long since relegated to the scrap-pile or to the museum of antiquities.

(4) It should discuss general chemistry as a pure science and for its own sake and not as a preparation for analysis.

(5) Formulae should have their proper place as a means of expressing ascertained truth, and not as an end of study, or worse yet, as means of ascertaining truth.

Whether a text-book is used or not, the laboratory should contain a number of text and reference books for the use of teacher and pupils.

Omitting many text-books and laboratory manuals which may be had for the asking, the books in the following list will be found useful:

Remsen: Inorganic Chemistry. Theoretical Chemistry.

Roscoe and Schorlemmer: Treatise on Chemistry, Vols. I. and II.

Newth: Text-book of Chemistry. Chemical Lecture Experiments.

Thorpe: Essays on Historical Chemistry.

Ostwald: Grundlinien der Anorganischen Chemie (when translated) General Chemistry. Solutions.

E. von Meyer: History of Chemistry.

Mendelejeff: Principles of Chemistry.

Richter: Organic Chemistry.

Ramsay: Gases of the Atmosphere.

Walker-Dobbin: Chemical Theory for Beginners.

Fresenius: Qualitative Analysis.

Lassar-Cohn: Chemistry of Every-day Life.

Borchers: Electro-Smelting and Refining.

WALTER S. HENDRIXSON.

DRAWING.

Pupils entering the high school are full of restless activity and their ideas about themselves and their relation to society and the future are uncertain. Too frequently the parents have had no definite plans for the child, who rambles on through the grades and through the high school without the slightest idea what he is to do when he is through.

The instruction of our high schools then should be necessarily

broad and fundamental. The body as well as the mind should be brought under subjection and suggestions should be given along many lines which tend toward full development.

If the graduate goes out with mind, eye and hand trained he is prepared to enter upon professional, scientific, mechanical or manual work. Drawing then should be regarded as a necessity in our schools, for it develops thought and reasoning power, trains the eye and hand and equips one for life's work.

We are all united in opinion as to the necessity of drawing in connection with physiology, zoology, geology, geometry, geography, botany, physics, history and reading. The teacher should draw on the blackboard when explaining the lesson and the pupil should illustrate his note book and written lessons making his knowledge more accurate and expressing it unequivocally.

But all this is of minor importance. Prof. Wm. Jones, of Harvard says: "As much, if not more can be got from drawing in the way of general training than from either the languages or mathematics. In fact no other single subject is capable of training the mental faculties to the same extent." Deftness and inventiveness in shaping material is a basis for all kinds of skillful work as well as all aesthetic expression. Drawing has a right to an independent existence and should be recognized because of its own power and purpose. Teach the pupil to see truth and beauty and he will represent it according to the cast of his mind, either scientifically or artistically. Help him to realize that such appreciation is laudable and the world will have more Audubons, Agassiz, Longfellows and Bryants. If all cannot attain to greatness all can be taught to appreciate it in others. Better work will come from the foundries, tin shops, planing mills, potteries, woolen mills, book binderies, printing offices, silver mills and manufactories in general if drawing is properly taught in the public schools and of course from the high school alone can we expect to get practical results.

England's experience in competing with France in textile fabrics should be recalled. Recognizing her artistic deficiencies she established a national school of design, where artist artizans were trained with little or no improvement in the manufactured articles. It was evident that the factories were not being influenced and in order that they should be, it was necessary to place instruction within the reach of all. Lessons in design were made obligatory in the common schools and trade improved.

We, as a people have been learning the same lesson. Only through instruction in drawing, given in our public schools, can we expect to compete with other nations in manufactured articles. It is through the general dissemination of the fundamental art principles that the workman and the public are trained. If we would sell our goods at home or abroad they must be as good as the best.

It is necessary to make use of our own abundant material to get the full share of profit from commercial activities. The decorative designs of the present should be based largely on those of the past. In historical art the spirit of the nation, not a fleeting idea of an individual, is studied. A unit of design that has received the approbation of centuries is certainly worthy of our respect. In addition to the art culture received in this way, history itself becomes more impressive and a sense of comradeship exists for the one who copies the ancient ornament. Botany, too, comes to the assistance of the designer, for nature, as well as geometry and art, is his inspiration. An excellent knowledge of the growth, habit and form of a plant is necessary if its correct type is given by conventionalization.

The application and combination of color is both attractive and instructive. As a people we are very deficient in the color sense and should put forth an effort towards its acquirement. Taste depends upon education, not heredity. Satisfactory work can be done in color by the use of choice papers prepared by the educational companies for this purpose or of colored pencils if their range is great enough, but far more preferable and educational is the use of water colors. With them almost every variety of hue and tone can be obtained and much more skill is developed in their management. Closely connected with this subject is that of the work of drawing. Both demand refined precision, accuracy, order and symmetry. Beauty as well as utility should enter into the construction of buildings, machines and furnishings in general. Constructive drawing is of prime importance. It develops the inventive faculties and requires appreciation of proportion and propriety.

If drawing has been taught in the grades and a knowledge of correct drawing and placing of the views has been obtained from the type forms and common objects, more elaborate designs should be attempted in the high school. Objects should be selected for the exercises which possess beauty of form as well as good construction. The work might commence with a review of the facts of some of the type forms, afterwards drawing from objects based upon them, e. g.: the principles of the square prism are the same as those of any rectangular object, as a table, bench, settee, chair, desk, cupboard, etc.

The pupil should himself take the measurements from the objects and give them the top, front and side views of most of the forms studied. A cast of the Doric, Tuscan or Ionic order might be used advantageously, requiring the top and front views. Original designs and plans of articles in common use should be required. Plans of elevations of houses should also be expected. Copy one or two, then call for original work such as drawing the

top, front and side views of the house in which he lives and its several floor plans or such diagrams of the school house or other public buildings. These views might be combined in mechanical perspective exercises giving the appearance as well as facts of the models.

This subject is clearly and attractively presented by C. F. Edminister in "Architectural Drawing" and L. W. Miller in "Essentials of Perspective." Drawing boards, T squares and triangles, rulers, compass and dividers should be in the possession of each pupil. Water colors may also be used here if the standard of the school is high enough. Representation must necessarily occupy the greater portion of time assigned to drawing and in presenting it great pains should be taken to insist that appearance, not fact, is wanted. Art is not a mirror-like reproduction of nature, but is what an intellectual being sees or desires to see in certain moods. He may be interested in the dawn or evening with results in the manner of Corot or Guido Remi. His sympathies may be enlisted with the poor and suffering as were Millet's and Muncaczy's. He may see the faithfulness and devotion of the brute and present them as did Rosa Bonheur and Landseer, or he may see beauty in the human form and express it as did Praxitiles and Michael Angelo.

Realizing that the pupil of the high school is of the most impressible age, that the after course of his life is usually determined there, it should be one of the first aims of the public school to instil an appreciation of art. The silent forces are often the most potent. Good prints of the best architecture, designs, statues and paintings should be held essential in school room furnishing, especially where the community is barren of such adornments.

Art gives more inspiration and encouragement than nature, for in the midst of the grandeur and beauty of the latter the amateur is confused and overwhelmed, but the former gives encouragement, a feeling of emulation and enables him to acquire the grammar of art.

We add the following miscellaneous suggestions:

Much can be accomplished in the study of composition under the influence of the Perry pictures so common in our day.

Arthur W. Dow has given most valuable assistance in his book on this subject. "How to Enjoy Pictures" should be in every school library. It should be remembered that forms are made visible by light and shade alone; consequently in representing them, not outline but light and shade should appear.

Good spirited work should be done in water colors from life and still life as well as in design. Every effort should be made to develop the color sense.

Drawing from memory and imagination can be profitably pursued in the high school.

The most lasting impressions and the most artistic results are to be obtained in this way.

The medium used is of slight importance, whether brush, pencil, charcoal or pen.

The result depends upon mental perception. When we realize that drawing is a mental process and not an inborn talent, then, and not until then, can we expect to have good work in our schools.

FRENCH.

I. ELEMENTARY COURSE.

1. THE AIM OF THE INSTRUCTION. At the end of the elementary course the pupil should be able to pronounce French accurately, to read at sight easy French prose, to put into French simple English sentences taken from the language of every-day life, or based upon a portion of the French text read, and to answer questions on the rudiments of the grammar as defined below.

2. THE WORK TO BE DONE. During the first year the work should comprise (a) careful drill in pronunciation; (b) the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural of nouns, the inflection of adjectives, participles and pronouns; the use of personal pronouns, common adverbs, prepositions, and conjunctions; the order of words in the sentence, and the elementary rules of syntax; (c) abundant easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (d) the reading of from 100 to 175 duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read, the teacher giving the English. and in reproducing from memory sentences previously read; (e) writing French from dictation.

During the second year the work should comprise: (a) the reading of from 250 to 400 pages of easy modern prose in the form of stories, plays, or historical or biographical sketches; (b) continued practice in translating into French easy variations upon the texts read; (c) frequent abstracts, sometimes oral and sometimes written, of portions of the text already read; (d) writing French from dictation; (e) continued drill upon the rudiments of grammar, with constant application in the construction of sentences; (f) mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simpler uses of the conditional and subjunctive.

When only one year's work in French is attempted, at the close of the secondary course, the total amount of reading indicated above must be reduced by about one-fourth.

Suitable texts for elementary reading are About's *Le Roi des montagnes*; Brunot's *Le tour de la France*; Daudet's easier short tales; De la Bedolliere's *La Mere Michel et son chat*; Erckmann-Chatrian's stories; Froa's *Contes biographiques* and *Le petit Robinson de Paris*; Foncin's *Le pays de France*; Labiche and Martin's *La poudre aux yeux* and *Le voyage de M. Perrichon*; Legouve and Labiche's *La cigale chez les fourmis*; Malot's *Sans famille*; Mairet's *La tache du petit Pierre*; Merimee's *Colomba*; extracts from Michelet; Sarcey's *Le siege de Paris*; Verne's stories.

3. SUGGESTIONS TO THE TEACHER. The suggestions offered below upon the teaching of elementary German are, in the main, equally applicable to the teaching of elementary French. While each language has its own peculiar difficulties that require special attention from the teacher, the general principles that should regulate the work are the same for both. Only a few supplementary observations need be added here.

The educational value of the study of French in cultivating habits of careful discrimination, of mental alertness, of clear statement, must never be lost from view, and the expediency of an exercise must often be determined by its utility in attaining these ends. With regard to drill in grammar, it is not for the secondary school to spend time over the many pages of exceptions, peculiarities in gender and number, idioms that one rarely sees and never thinks of using, and grammatical puzzles for which each learned grammarian has a different solution, that form so large a part of some grammars. The great universals, however, (the regular and the common irregular verbs; negative and interrogative variations; the common use and meaning of moods and tenses; the personal pronouns and their position; the general principles governing the agreement of adjectives, pronouns and participles; the partitive constructions; the possessives, demonstratives, interrogatives, and relatives; the most common adverbs, conjunctions, and prepositions), should all be thoroughly understood by the end of the elementary course, and subsequent study should give considerable facility in using them.

The verb seems most formidable; but when it is perceived that most forms of all verbs may be treated as identically derived from the "primitive tenses," the difficulties appear less numerous, and when the principle of stem differentiation under the influence of tonic accent, persisting in the older and more common verbs, is a little understood, the number of really unique forms is inconsiderable.

No attempt should be made to teach literature until the pupil is quite familiar with ordinary prose and can read page after page of the text assigned with no great need of grammar and dictionary. The classics of dramatic literature may very properly be postponed until the fourth year, and are not always desirable even then; but a few are given below among texts suitable for the intermediate course in the hope that these, rather than others, will be selected by teachers who, for reasons of their own, choose to read something of the kind at this stage of the course.

II. INTERMEDIATE COURSE.

1. THE AIM OF THE INSTRUCTION. At the end of the intermediate course the pupil should be able to read at sight ordinary French prose or simple poetry, to translate into French a connected passage of English based on the text read, and to answer questions involving a more thorough knowledge of syntax than is expected in the elementary course.

2. THE WORK TO BE DONE. This should comprise the additional reading of from 400 to 600 pages of French of ordinary difficulty, a portion to be in the dramatic form; constant practice in giving French paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; the study of a grammar of moderate completeness; writing from dictation.

This represents the amount of work contemplated in the two years' preparatory course adopted by the College Department of the Iowa State Teachers' Association.

Suitable texts are: About's stories; Augier and Sandeau's *Le Gendre de M. Poirier*; Beranger's poems; Corneille's *Le Cid* and *Horace*; Coppee's poems; Daudet's *La Belle Nivernaise*; *La Brete's Mon oncle et mon cure*; Mme. de Sevigne's letters; Hugo's *Hernani* and *La Chute*; Labiche's plays; Loti's *Pecheur d'Islande*; Mignet's historical writings; Moliere's *L'Avare* and a *Le Bourgeois Gentil'homme*; Racine's *Athalie*, *Andromaque*, and *Esther*; George Sand's plays and stories; Sandeau's *Mlle. de la Seigliere*; Scribe's plays; Thierry's *Recits des temps merovingiens*; Thier's *L'Expedition de Bonaparte en Egypte*; Vigny's *La canne de jonc*; Voltaire's historical writings.

III. ADVANCED COURSE.

1. THE AIM OF THE INSTRUCTION. At the end of the advanced course the pupil should be able to read at sight, with the help of vocabulary of special or technical expressions, difficult French not earlier than that of the seventeenth century; to write in French a short essay on some simple subject connected with the works read; to put into French a passage of easy English prose, and to carry on a simple conversation in French.

2. THE WORK TO BE DONE. This should comprise the addi-

tional reading of from 600 to 1,000 pages of standard French, classical and modern, only difficult passages being explained in the class; the writing of numerous short themes in French; the study of syntax.

Suitable reading matter will be: Beaumarchais's *Barbier de Seville*; Corneille's dramas; the elder Dumas's prose writings; the younger Dumas's *La question d'argent*; Hugo's *Ruy Blas*, lyrics, and prose writings; La Fontaine's fables; Lamartine's *Graziella*; Marivaux's plays; Moliere's plays; Musset's plays and poems; Pellissier's *Le Mouvement litteraire au xix siecle*; Renan's *Souvenirs d'enfance et de jeunesse*; Rousseau's writings; Sainte-Beuve's essays; Taine's *Origines de la France contemporaine*; Voltaire's writings; selections from Zola, Maupassant, and Balzac.

JOHN S. NOLLEN,
FRANCIS A. WOOD.

GERMAN.

I. ELEMENTARY COURSE.

1. THE AIM OF THE INSTRUCTION.

At the end of the elementary course the pupil should be able to read at sight, and to translate, if called upon, a passage of very easy dialogue, or narrative prose, help being given upon unusual words and constructions; to put into German short English sentences taken from the language of every-day life or based upon the text given for translation, and to answer questions upon the rudiments of the grammar as defined below.

2. THE WORK TO BE DONE.

During the first year the work should comprise: (a) Careful drill upon pronunciation; (b) the memorizing and frequent repetition of easy colloquial sentences; (c) drill upon the rudiments of grammar, that is, upon the inflection of the articles, of such nouns as belong to the language of everyday life, of adjectives, pronouns, weak verbs, and the more usual strong verbs, also upon the use of the more common prepositions, the simpler uses of the modal auxiliaries, and the elementary rules of syntax and the word order; (d) abundant easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (e) the reading of from 75 to 100 pages of graduated texts from a reader, or in the form of simple stories, with constant practice in translating into German easy variations upon sentences selected from the reading lesson (the teacher giving the English), and in the reproduction from memory of sentences previously read.

During the second year the work should comprise: (a) The

reading of from 150 to 200 pages of literature in the form of easy stories and plays; (b) accompanying practice, as before, in the translation into German of easy variations upon the matter read, and also in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages; (c) continued drill upon the rudiments of the grammar, directed to the ends of enabling the pupil, first, to use his knowledge with facility in the formation of sentences, and, secondly, to state his knowledge correctly in the technical language of the grammar.

3. SUGGESTIONS TO THE TEACHER.

Stories suitable for the elementary course can be selected from the following list (arranged alphabetically): Anderson's *Maerchen* and *Bilderbuch ohne Bilder*; Arnold's *Fritz auf Ferien*; Baumbach's *Maerchen*, *Die Nonna*, and *Der Schwiegersohn* Gerstaecker's *Germelshausen*, Heyse's *L'Arrabbiata*, *Das Maedchen von Treppi*, and *Anfang und Ende*; Hillern's *Hoeher als die Kirche*; Jensen's *Die braune Erica*; Leander's *Traumereien* and *Kleine Gersichten*; Seidel's *Maerchen*; Stokl's *Unter dem Christbaum*; Storm's *Imensee* and *Geschichten aus der Tonne*; Zschokke's *Der zerbrochene Krug*.

Good plays adapted to the elementary course are much harder to find than good stories. Five act plays are too long. Among shorter plays the best available are perhaps: Benedix's *Der Prozess*, *Der Weiberfeind* and *Guenstige Vorzeichen*; Elz's *Er ist nicht eifersuechtig*; Wichert's *An der Majorsecke*; Wilhelmi's *Einer muss heiraten*. It is recommended, however, that not more than one of these plays be read. The narrative style should predominate.

Translation from German into English should be idiomatic, not literal. The pupil should be constantly reminded that he is transferring, from one language to another, ideas not words. But from the outset it should not be forgotten that the principal object of study is not to learn to translate, but to learn to read understandingly without translating. This end can best be accomplished by beginning with some very easy text in connection with the grammar. And, as a rule, a class should never be put into a text, the substance of which it cannot understand at sight.

REPRODUCTIVE TRANSLATION INTO GERMAN. The program of work provides for practice "in the off-hand reproduction, sometimes orally and sometimes in writing, of the substance of short and easy selected passages." This is what the Germans call "*freie reproduktion*," and is one of the most profitable exercises possible. It teaches the pupil to give heed not only to the meaning, but to the form in which it is expressed, to put thoughts in German with German as a starting point. The language of the original should, of course, not be memorized verbatim; what is wanted is not an effort of the memory, but an attempt to express thought in German forms that are remembered only in a general way. The objection to independent translation from English into German is that for a long time it is necessarily

mechanical. The translator has no help except his grammar and dictionary, and his translation is mere upsetting. In free reproduction, on the contrary, he instinctively starts from his memory of the original. His thoughts tend to shape themselves in German form. In short, he learns to think in German.

II. INTERMEDIATE COURSE.

1. THE AIM OF THE INSTRUCTION. At the end of the intermediate course the pupil should be able to read at sight German prose of ordinary difficulty, whether recent or classical; to put into German a connected passage of simple English, paraphrased from a given text in German; to answer any grammatical questions relating to usual forms and essential principles of the language, including syntax and word formation, and to translate and explain (so far as explanation may be necessary) a passage of classical literature taken from some text previously studied.

2. THE WORK TO BE DONE. The work should comprize, in addition to the elementary course, the reading of about 400 pages of moderately difficult prose and poetry, with constant practice in giving, sometimes orally and sometimes in writing, paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; also grammatical drill upon the less usual strong verbs, the use of articles, cases, auxiliaries of all kinds, tenses and modes (with special reference to the infinitive and subjunctive), and likewise upon word order and word formation.

This represents the work of the second year in the two years' course adopted by the College Department of the Iowa State Teachers' Association.

3. SUGGESTIONS TO THE TEACHER. Suitable reading matter can be selected from such works as the following: Ebner-Eschenbach's *Die Freiherren von Gemperlein*; Freytag's *Die Journalisten* and *Bilder aus der deutschen Vergangenheit* (e. g., *Karl der Grosse*, *Aus den Kreuzzuegen*, *Doktor Luther*, *Aus dem Staat Friedrichs des Grossen*); Fouque's *Undine*; Gerstäcker's *Irrfahrten*; Goethe's *Hermann und Dorothea* and *Iphigenie*; Heine's poems and *Reisebilder*; Hoffmann's *Historische Erzählungen*; Lessing's *Minna von Barnhelm*; Meyer's *Gustav Adolfs Page*; Moser's *Der Bibliothekar*; Riehl's *Novellen* (e. g., *Burg Neideck*, *Der Fluch der Schönheit*, *Der stumme Ratsherr*, *Das Spielmannskind*); Rosegger's *Waldheimat*; Schiller's *Der Neffe als Onkel*, *Der Geisterseher*, *Wilhelm Tell*, *Die Jungfrau von Orleans*, *Das Lied von der Glocke*, *Balladen*; Scheffel's *Der Trompeter von Säckingen*; Uhland's poems; Wildenbruch's *Das edle Blut*.

The general principles of teaching set forth in the preceding section apply also to the work of the intermediate course. Translation should be insisted upon so far as necessary, but the aim should be to dispense with it more and more. Every expedient

should be employed which will teach the scholar to comprehend and feel the original directly, without the intervention of English. Occasional exercises in preparing very careful written translations should be continued. Practice should be given in reading at sight from authors of moderate difficulty, such as Riehl or Freytag. The "free reproduction" should by all means be kept up. It will be found much more valuable at this stage than independent translation from English into German. In dealing with classical literature, thorough literary studies are, of course, not to be expected, but an effort should be made to bring home to the learner the characteristic literary qualities of the text studied, and to give him a correct general idea of the author. In the case of the drama, at least, some study of structural technique will often add interest to the work. The teacher will find Freytag, *Technik des Dramas*, or Franz, *Aufbau der Handlung in den klassischen Dramen* (Velhagen und Klasing, 1892), good guides in this study.

III. ADVANCED COURSE.

1. THE AIM OF THE INSTRUCTION. At the end of the advanced course the student should be able to read, after brief inspection, any German literature of the last one hundred and fifty years that is free from unusual textual difficulties, to answer in German questions on the lives and works of the great writers studied, and to write in German a short, independent theme upon some assigned topic.

2. THE WORK TO BE DONE. The work of the advanced course (last year) should comprise the reading of about 500 pages of good literature in prose and verse, reference reading upon the lives and works of the great writers studied, the writing in German of numerous short themes upon assigned subjects, independent translation of English into German.

3. SUGGESTIONS TO THE TEACHER. Suitable reading matter for the last year will be: Freytag's *Soll und Haben*; Fulda's *Der Talisman*; Goethe's dramas (except *Faust*); Goethe's prose writings (say extracts from *Werther* and *Dichtung und Wahrheit*); Grillparzer's *Ahnfrau*, *Sappho*, or *Der Traum ein Leben*; Hauff's *Lichtenstein*; Heine's more difficult prose (e. g., *Ueber Deutschland*); Kleist's *Prinz von Homburg*; Koerner's *Zriny*; Lessing's *Emilia Galotti* and prose writings (say extracts from the *Hamburgische Dramaturgie* or *Laokoon*); Scheffel's *Ekkehard*; Schiller's *Wallenstein*, *Maria Stuart*; Braut von *Messina*, and historical prose (say the third book of the *Geschichte des dreissigjährigen Krieges*); Sudermann's *Johannes*. Tieck's *Genoveva*; Wildenbruch's *Heinrich*.

A good selection from this list would be (1) A recent novel, such as *Ekkehard* or *Soll und Haben*, read in extracts sufficient to

give a good idea of the plot, the style, and the characters; (2) Egmont or Goetz von Berlichingen; (3) some of Goethe's prose, say the Sesenheim episode from *Dichtung und Wahrheit*; (4) Wallenstein's Lager and Wallenstein's Tod, with the third book of the Thirty Years' War; (5) Emilia Galotti; (6) a romantic drama, such as Genoveva or Der Prinz von Homburg. It is assumed that by the time the fourth year is reached, translation in class can be largely dispensed with and the works read somewhat rapidly. Of course, they cannot be thoroughly studied, but thorough literary study belongs to the college or the university. It is not sound doctrine for the secondary school that one work studied with the painstaking thoroughness of the professional scholar is worth half a dozen read rapidly. In the secondary school the aim should be to learn to read easily, rapidly, and yet with intelligent general appreciation, somewhat as an ordinary educated American reads Shakespeare.

JOHN S. NOLLEN,
FRANCIS A. WOOD.

GREEK.

I. PRELIMINARY STATEMENT.

The common arrangement of high school courses under present day conditions proposes, as most conducive to the attainment of all the various ends in view, Latin as a central language study, to be continued throughout the four years. As contributory to the aims of high school training, it is also proposed to offer for the last two years of the course as an optional study a second foreign language. This language may be Greek, German or French. The natural tendency will be to select a modern language from this optional group of studies, on the ground that as one ancient language, Latin, has already been taken, no adequate reason can be assigned for introducing a second one into the high school course. The decision of this matter affirmatively or negatively will depend upon the circumstances bearing upon the individual cases. It is never wise to assert dogmatically that Greek *should* or *should not* be taught in the high school. If taught properly it has great and distinct educational value, and no pains should be spared in defining this value in those schools where an option is offered in its favor.

II. THE JUSTIFICATION OF GREEK.

Greek is peculiarly an original language in the sense that it stands chronologically at the head of the literary languages of the world, and contains in itself the first types of the most distinctive and fundamental forms, particularly epic and lyric poetry, tragedy, comedy and artistic prose in history, oratory and philosophy.

These are not imperfect types, but, compared with those produced in subsequent times in the most cultivated languages, are found to stand as models of perfection and to furnish inspiration for much of the great literature of the world.

The history of what is distinctively our world begins with the people who used the Greek language. The new Testament is written in Greek.

The spirit of democracy and of intellectual freedom is in the Greek language and in these respects it is much nearer to the spiritual life of the American people than Latin. In these respects it will also bear scrutiny in comparison with modern languages.

It is the language that was spoken by one of the most original and creative people that ever lived and through it has come contributions of inestimable value to the life and thought of the modern world.

The study of a language having so many claims to pre-eminence and having in it so much that is fundamental, has a distinct value from a pedagogical point of view which ought not to escape the notice of those who insist on the modern or scientific spirit in education.

It may be well in leaving this branch of the subject to call attention to the fact that there is a well-marked tendency in the secondary schools to study one ancient and one modern language if two languages are offered. In such cases Latin is almost universally chosen. If this tendency develops into distinct educational policy, then it may be questioned whether the one ancient language should be Latin rather than Greek, and whether the philological eminence of Latin should have such undue weight in settling a question so important for the intellectual life of coming generations.

III. THE FIRST REQUISITE.

The first requisite for successful work in Greek is adequate understanding of the subject on the part of the teacher. It may be said that this is true of every subject; it is pre-eminently true of this. Greek must secure recognition if at all, by its own intrinsic merits. The indirect and incidental support that Latin, or mathematics, or modern language, or science has, it does not have. To receive attention it must be presented by some one who knows something of its real and vital significance. The weary road through the Greek declension and conjugation must be relieved by the systematic and appreciative understanding of the teacher, if the pupil is to persevere with the proper degree of enthusiasm. Immature work in the Greek class-room will destroy interest at the most important time. The teacher who takes a class through one year of Greek study without giving him some glimpses of the more pleasing prospects beyond is a failure as a teacher of Greek.

IV. TIME TO BE DEVOTED TO GREEK.

Given a competent teacher the consideration of second importance is the time to be devoted to the study. The course of study proposed in connection with this manual assigns the second language to the third and fourth years. If any satisfactory results are to be secured in this length of time, there should be five recitation periods a week of not less than forty-five minutes each. Better results would be secured in a one hour period. In two years under such circumstances a properly qualified teacher can prepare a pupil for admission to the majority of our colleges, at least with entrance conditions of no great difficulty. There should be no attempt to "cram" or "force," but rather there should be a normal advance according to the average ability of the class. Any college would prefer a pupil "under conditions," because less than the full requirement had been completed, but with intelligent understanding of the work already done, to one hastily and superficially forced over a larger amount. For example, it is more desirable that a pupil be able to read easy Greek readily than that he be able to "pass" on the speeches of Xenophon, as a result of special cramming. The only criterion of successful work is the actual understanding of the pupil.

V. ESSENTIALS FOR ABILITY TO READ GREEK.

In an elementary Greek course one fundamental object should be constantly before the mind of the teacher, namely, to teach his pupils to read. Contributory to this are three essentials: 1. A knowledge of inflectional forms. 2. A knowledge of words (vocabulary). 3. A knowledge of the grammatical structure of the average Greek sentence (syntax). These three things are "essentials" only as far as they contribute to reading ability. Too often they receive the predominant share of the attention, while the one fundamental aim is almost lost to view.

VI. INFLECTIONAL FORMS.

The constantly recurring inflectional forms should be thoroughly mastered, gradually, as they occur in the lessons and paradigms. As far as possible this work should be correlated to the reading and writing of Greek. Nothing is so unpalatable and unprofitable as the mere memorizing of forms out of relation to any vital structure. Whenever it is necessary to insist on this, haste should be made to illustrate the functional powers of the dead forms by copious reading and writing exercises. Indiscriminate memorizing of forms is pernicious and will defeat its own end.

Nothing said in this connection is to be construed as underrating the importance of knowing the inflectional forms. This knowledge is fundamental, but the memorizing of forms is never to be substituted for the practical understanding which comes only

through work with the Greek sentence in class drill; care should be taken to discriminate between common forms and those little used.

VII. VOCABULARY.

The acquiring of a vocabulary is a very important problem and it should be approached in a rational and practical manner. To commit words to memory will not answer the requirements. More important it is to memorize words in their relations in the Greek sentence so that with the vocabulary there may come to the learner something of the peculiar genius of the language. In the Greek lessons a large majority of the words used in the *Anabasis* should become very familiar. To note how readily this may be done the following words are quoted from the preface of a well known beginner's book: "In the eleven lessons, one hundred and sixty-five words are used. One hundred and thirteen are nouns, twenty-six are verbs. These nouns occur in the *Anabasis* over thirty-five hundred times. The verbs occur more than twenty-two hundred times." It is true that the Greek vocabulary is very copious, but one may read the language with a surprising degree of ease and pleasure with a comparatively limited stock of words at command. Reading Greek aloud by the pupil, listening to it read by the teacher, memorizing sentences and select passages, oral exercises varied to suit the circumstances, retranslating, written exercises, all these devices will aid in acquiring a vocabulary, but none of them, or all of them together, will compensate for copious reading of simple Greek prose.

VIII. GRAMMATICAL RELATIONS.

The third point to be emphasized, a knowledge of grammatical relation, is not to be considered apart from the others, but is to be carefully united with them, in such a way that gradually the essential principles become well fixed in mind. Reviews should be frequent, and attention should be constantly called to passages already passed over in which there are points affording comparison with those in current exercises.

IX. GREEK PROSE COMPOSITION.

An invaluable help in all the points mentioned is Greek composition used constantly and judiciously. No definite rules can be given as to the best plan for conducting this exercise. If there is sufficient blackboard space a few illustrative exercises might be put upon the board each day as a part of the regular lesson. This will often prove better than a set exercise once a week even after the pupil has laid aside the first book for the *Anabasis*. It has less the appearance of a "grind" and will, if rightly conducted, contribute most effectively toward the mastery of the work in hand. Oral and written exercises in retranslation should be frequent. Impromptu

exercises are likely to be more helpful than those prepared outside of the class, because they exercise to a greater degree the pupil's mental independence and remove the possibility of reliance upon others.

X. SIGHT READING

Sight reading should be provided from the beginning, and should be practiced even if there are but a few moments for it. In no other way can the teacher so well get an insight into the difficulties that beset the student, and in no other way will the student himself learn so well to make practical application of the facts and principles which he is acquiring so rapidly. In all tests and examinations passages not previously seen should be chiefly used, so that the student may learn at once that an independent knowledge of Greek is the aim in view, rather than a superficial ability to read a certain number of pages of a given text.

XI. READING BOOKS.

A reading book should be in the hands of the pupil at the earliest practicable moment. Fortunately the best elementary books now introduce connected reading exercises from the first. Among such books are White's First Greek Book (Ginn & Company) and Forman's Greek Lessons (Harper Company). Moss's First Greek Reader is an excellent book for high school use.

XII. THE ANABASIS.

The Anabasis should be introduced as early in the course as possible. After this is done a part of the time should be devoted to a careful study of the text, and a part of it to more rapid reading. About two books should be subjected to careful analysis and study. An attempt should be made to read at least two books more rapidly.

The two methods should be used in conjunction so that the tedium of the slower process may be constantly relieved by the foretaste given by the more rapid reading, of the real end in view. The teacher can often gain much time and create great enthusiasm for this work by suggesting in advance the solution of some of the more troublesome difficulties.

XIII. HOMER.

The last part of the second year may be profitably devoted to Homer, provided the work of the preceding year and a half has secured in reasonable degree the desired results. Under the direction of a skillful teacher at least two books of Homer may be studied and the student given something of an insight into the real greatness and lasting value of the Greek epic. If this be done the enlargement of view that will accrue to him as a consequence will be an adequate compensation for any labor that may have been bestowed upon Greek, and in the life of any youth of average ability it will prove a practical thing, whether he continues his work as a student or not.

JOHN H. T. MAIN.

GRAMMAR I.

If there is any easy language, the language is not English. The structure of English is quite as complex and intricate as that of Sanskrit or Hebrew. For a specialist to claim that he has mastered it would be as absurd as a like claim concerning chemistry. The pupil ready to enter the high school has not mastered English grammar. If a better knowledge of the subject seems sufficiently desirable, in itself and educationally, a competent teacher will find no lack of new material.

A thorough, accurate knowledge of the simpler elements of English grammar should be gained before the pupil leaves the eighth grade. If he then never enters the high school he has acquired information that will have its value to him throughout life, and his course in grammar will have contributed not a little toward the development of his mind. If the pupil enters the high school, he has a preparation that is essential to the successful study of a foreign language and that will contribute to his success in studies less evidently related.

If elementary grammar has been well learned before the beginning of the high school course, probably the time of the ninth, tenth and eleventh grades may be used to better advantage than if given to repetitions of elementary grammar or even to courses in grammar somewhat more advanced. In the twelfth grade the pupil will bring to the work much greater capacity, both in maturity of mind and in knowledge to serve as the basis of comparisons.

To teach grammar successfully is difficult, but not impossible. When the teacher is skillful and well instructed, pupils do not find the subject impractical or dull. But the teacher of English needs special training quite as much as the teacher of Latin or of French. Without it, success should not be expected.

Teachers who have not studied the history of the language would find some knowledge of earlier stages in the development of English most helpful. Without a clear perception that the language has a life and a growth scientific study of English grammar is impossible and even merely practical study rests upon a wrong basis. Rules of grammar are not manufactured by grammarians; and disputed and doubtful points should be consistently referred to reason rather than to text-book authority.

Unfortunately no adequate manual exists to help the ambitious teacher conscious of defective preparation. All teachers of English should be familiar with Lounsbury's *History of the English Language* (Holt), and with Emerson's like-named work (Macmillan.) These books, however, treat almost exclusively of etymology, as does Sweet's *Short Historical English Grammar* (Clarendon Press). A sound and simple introduction to Old English is given in Bright's *Anglo-Saxon Reader* (Holt); to Middle English, in Liddell's *Chaucer* (Macmillan).

Among other reference books accessible to the teacher and the pupils should be Mason's English Grammar (Macmillan); the grammatical works of Bain (Holt); Words and Their Ways in English Speech, by Greenough and Kittredge (Macmillan); and Toller's History of the English Language (Macmillan).

Among good modern text-books for class use may be mentioned, as examples, the grammars of Whitney (Ginn), Whitney and Lockwood (Ginn), Baskervill and Sewell (American Book Co.), Davenport and Emerson (Macmillan), and Buehler (Newson & Co.) Other books will occur to any teacher, though competition in this field might well be more active.

The close relation between the various departments of English study should be recognized in all classes. While teachers do not now require pupils to parse all of *Paradise Lost*, interesting constructions should never be overlooked by classes in literature or in composition. Though grammar as a distinct subject may well be omitted in the ninth, tenth and eleventh grades, certainly no ground should be lost. The college student in the Greek New Testament is not required to parse every word, but he is required to be able to do this; and the teacher of Shakespeare should not be accused of sacrilege if he now and then recognizes that Shakespeare wrote in English.

C. F. ANSLEY.

GRAMMAR II.

English Grammar, in spite of the continual attempts to depreciate its value, is one of the leading subjects of an education. The ability to dissect, to get the "anatomy" and "physiology" of our language, then to re-create, to construct the language again from its verbal elements, this cannot be successfully depreciated by the most radical innovator.

Grammar may well have a half-year of the high school student's time. It should be studied preferably near the close of the course for if the pupil has studied Latin or any ancient or foreign language he will then have the advantage of the comparative study of language. Nothing so convinces a young person of the real "sense" of grammar as the finding of the same construction in different languages, such as the adverbial accusative for example. If the pupil has not studied any other language, his study of rhetoric, literature, science, advanced mathematics and his natural maturity of mind will fit him to see the laws of grammar in a very different light. The plan of studying grammar in the ninth grade too often is an excuse for idleness in the seventh and eighth grades. It ought to be possible to finish the elementary phase of grammar before entering the high school.

It will prove too taxing usually to teach grammar without a

text book, but the book should be carefully chosen. Text books in grammar are either inductive or deductive. Examples of the inductive class are Conklin, Metcalf, Southworth and Goddard, Reed and Kellogg, and Whitney. Of the deductive class are Harvey, Swinton, Maxwell, Raub, and Green. Each class has its supporters.

To the advocate of deductive methods, inductive text books seem without plan or arrangement, while the friends of inductive methods assert that the deductive texts are dry, unnatural and unintelligible. There is no doubt that grammar should first be presented inductively, but the high school work must be more or less a matter of review in this subject, and here the deductive method finds its proper field, for the pupil needs to group, arrange and classify his store of grammatical knowledge. He must decide, fix and retain rather than discover. If an inductive text is to be used, it ought by all means to have an analytical index as well as an alphabetical, so that the work may be taken up in topical form, regardless of the order of the book. It is unfortunate that authors have not seen fit to arrange analytical indexes for grammars, but by patient digging the teacher can prepare one for himself.

Pupils should be given much practice in looking up subjects by means of the index. At first this must be under the direction of the teacher, but the aim should be to lead the pupil to help himself to use his text book as a working manual to furnish him the help he most needs and to make him an independent student.

The analysis of the sentence should be the chief work of high school grammar classes. It calls forth to the highest degree the exercise of fine discrimination and keen reasoning power. By these powers the student is enabled to read the relations and interdependencies in the sentence and thus determine the office of each proposition, phrase and word. Try as we will in the grammar grades, the pupil will rely mainly on mechanical devices to distinguish the parts of speech. This has been the experience of the human race, as is shown by the highly inflected languages of the ancients. As nations became older they began to abandon the mechanical endings of words to show their use in a sentence. The English language being of such recent origin, has very few inflections. We must therefore tell by analysis of the thought what the ancients could recognize mechanically.

The first step to be taken in grammatical analysis of involved as well as simple sentences is the separation into subject and predicate. For example, the sentence, "It is one of the Indian rules of politeness not to answer a public proposition the same day it is made." The subject is "not to answer a public proposition the same day it is made;" the predicate, "Is one of the Indian rules of politeness." The predicate may ordinarily be distinguished by being of wider content than the subject.

Such work is purely logical and ought to be practiced freely with intricate and inverted sentences until a high proficiency is reached. Following this comes the separation of the subject into clauses, phrases and words. Much of this work is in reality a sort of disguised parsing, as when we speak of a noun clause, adjective phrase, or an adverbial modifier.

Written diagrams assist in analysis also, as the learner can see at every step the part of the sentence that he has finished and all that remains to be done. As well attempt to do away with the written solution in arithmetic as with diagrams in grammatical analysis.

The plan so often condemned, of giving peculiar sentences for analysis, such as "Crack went the whip!" seems to be justifiable when the sentences are used by way of introducing variety and exciting interest. Often they aid greatly in developing the keen and ready judgment so necessary in advanced work in grammar. It is akin to the prevalent practice in geometry of giving "exercises" for the student to solve. Inverted and elliptical sentences furnish excellent material for this work.

Greater analytical power should give greater synthetic power, and hand in hand with the dissection of sentences must go the building of sentences. Learn to analyze intricate English composition and then take up the original work of building such structures. Great benefit may be derived by giving many original sentences illustrative of each type studied. Any one who has studied Latin knows how spontaneously the person who reads Cæsar's Gallic War adopts participial constructions. Such results should be obtained, if work in synthesis is combined with analysis.

An excellent device to lead the pupil to see his own shortcomings in composition is to place side by side with one of the loose, inaccurate sentences from his experiment book in physics or chemistry one of the gems of a master of clear and pure English like Hawthorne or Irving and note such points as accurate use of connectives, participial abridgements, and relative clauses, and have the student compare this with his own crude work.

Parsing is the application of tests to determine the use of a word in a sentence; never does it consist in going through a certain routine as if the word had such inherent properties. Perhaps it is better not to have formal parsing. Taking the sentence, "There was a general rush to Cape Nome," how is "rush" used? Subject of the affirmation, hence noun, nominative case. What does "general" do? Describes "rush," hence descriptive adjective. Thus the necessary facts are brought out and the ruts of routine are avoided.

The principles of grammar which will help correct prevalent errors of speech ought to be strongly emphasized. The high

school pupil will correct his errors of speech by application of grammatical principles where the lower grade pupil is obliged to depend on memorizing correct forms. Hence the high school boy and girl need to emphasize the principal parts of irregular verbs, the objective and nominative forms of pronouns, agreement of the verb with its subject; in brief the entire field of inflection needs to be searched and every point of weakness thoroughly covered.

G. E. FINCH.

GEOLGY.

Much that might be offered in the way of suggestion to teachers of geology has been said under the section of physical geography, the more elementary and the more widely taught of these two related earth sciences.

In many of the towns of the state geology is of particular interest on account of the richness of the local field. Nowhere is there wanting a ready approach, and in cities dependent in part on mining, as Dubuque, Ottumwa, and Fort Dodge, or of national fame for the richness of fossiliferous outcrops, such as Burlington and Rockford, or fortunate in the exposures of various formations or in the topographic interest of the locality, as are towns and cities too numerous to mention, the local conditions awakening curiosity and interest may well make geology a favorite science.

Geology affords, as perhaps no other subject can, a continuous discipline in inductive reasoning. It gives practice in logical statement of trains of reasoned thought, and the many problems the progressive teacher will suggest as original exercises give it a field comparable to that of inventional geometry. It enlarges the mind to conceive of the vast lengths of geologic time perhaps even more than to realize in astronomy the immensity of space. For the interstellar spaces are void, while the vistas of geologic time are crowded with the events which make the history of creation.

Geology is of educational value on account of its close correlations with other subjects. It prolongs the perspective of history. It gives a long and pregnant past to zoology and botany. It applies the principles of chemistry and physics, and borrows freely from astronomy. Especially is the geologic control over geography direct and far reaching, and it is exercised thus mediately, as well as in many ways immediately, over the life and work and history of man.

Furthermore, the science is fundamental in the training of teachers. The newer geographies, with their wealth of geologic fact and principle, cannot be successfully taught by one ignorant of geology. As the eminent German geographer, Baron Richthofen, has well said, "The surest foundation for the study of geography is geology in its whole compass, as being the only means to

an understanding of the earth's surface." So long as the high school supplies the teachers of geography in the grades, should it provide for the effective teaching of the subject matter of geology, under whatever name it may be known.

In order to make the science of the greatest value in the equipment of teachers of geography, it is well to give much space to the dynamic and physiographic sides of the subject. In this, the science of land forms, we tread the overlap-land between geology and geography. It was, however, by geology that it was explored, and described. Educationally, also, the simpler and more easy approach is found on the geologic side, the path of genesis and process, instead of the geographic path of classification by form. Geology thus binds as closely as possible together causes and consequences, process and the resulting land form.

The action of the geologic agents and the modeling of the earth's surface they produce can hardly be given too much space. Land forms should be made real by model, photograph, lantern-view, and especially by the topographic map. These will be more readily understood if practice is first given in contouring some relief-form, a detached hill, or some ravine. In especial, field excursions should be taken to all accessible objects of geologic interest. Exposures of the indurated rocks and of glacial till with associated sands and loess can hardly be studied too thoroughly. The cemetery may afford examples of at least the beginning of rock disintegration. Profiles of creek or river valley should be made. In this work in the field the reports of the Iowa Survey are found of great value.

One result of out-door excursions should be the gathering of a small school museum. Collections of common rocks and rock-making minerals may be obtained cheaply from dealers, as from Ward's Natural Science Establishment, Rochester, N. Y., and E. E. Howell, Washington, D. C. But nothing can take the place of the well-labelled collection of common specimens illustrating great principles. The block of red clay in place on the decayed limestone from which it weathered, the limestone fragment with the crystalline fossils left in relief above the softer granular matrix, the film of ferric oxide from the decomposition of hornblende, the whitened crust of feldspathic rock changing to kaolin, the flint nodule, the ripple-marked sandstone, the pebble faceted by glacier or rounded by the river—such are the homely specimens worth more to a school than some rare and brilliant ores from distant states.

Drawing should be made much of both in the laboratory and in recitation. Sections given in the text should be faithfully reproduced on the blackboard, and many others may be obtained as inventional exercises. Profiles should be drawn from topographic maps. In making geologic sections those of the Iowa Geologic Survey will be

found helpful, especially those in the report on Artesian Wells in the Sixth Annual Report.

Historic geology should be given a subordinate place. Its difficulty is due largely to the lack on the part of the pupil of definite knowledge of the present forms of life. It is an incidental value that something of zoology and botany may be thus taught. The pupil may perhaps learn for the first time of the splints of the horse's leg when he studies the legs of its ancestors. It is recommended that considerable room be made for the history of the Pleistocene. Maps of the state should be drawn, showing the area of the different drift sheets, and students should be made thoroughly familiar with their topographic expressions.

An increasing interest and demand is evidenced by the number of text books recently issued and announced as in preparation. Brigham's *Geology* (Appleton, 1901) is well written and admirably illustrated, well up to date and perhaps not too difficult for the higher grades of the high school where considerable time can be given. Tarr's (*The Macmillan Co.*, 1897) is a lighter book, a simple and lucid presentation of the leading principles of the science.

WILLIAM HARMON NORTON.

MUSIC.

GENERAL OBSERVATIONS.

1. Music, to be successful, must be taught with as much earnestness of purpose as any other branch of study.

2. Music should have an accredited place in the curriculum, counting for graduation. (The opinion of the author not yet concurred in by the Committee.—CHAIRMAN.)

3. Music in high school should have two thirty to forty minute periods per week.

4. Glee clubs or special organizations of talented pupils should be formed and used on special days to encourage and develop such talent.

5. The music used in high school should be on the same high plane as its literature, its songs selected as carefully as its classics.

6. High school choruses, to do careful work, should contain 100 to 150 pupils. In large schools two, three or four divisions is preferable to one large chorus.

I. CITY SCHOOLS.

A. When music has been taught in the grades.

1. *General Requirements.*

a. The work done must depend upon the thoroughness and scope of the results obtained in the grades below the high school.

- b. If the children have not mastered the rudiments of sight reading — ability to sing at sight with good tone and interpretation, easy songs in all keys, this must be reviewed in high school.
 - c. The pupil should have a correct idea of time or rhythm in simple and complicated arrangements.
 - d. Should be able to sing easily moderately difficult chromatic tones, also the minor scales in different forms.
 - e. Voices should have been tested and placed on part suited to the individual. Pupils should be able to carry their part, sustaining the tone true to pitch.
 - f. Pupils should have learned a number of selections from the masters and distinguished between the styles of composition.
 - g. If pupils are thus equipped on entering high school, the further work of studying the musical literature of the best composers becomes an easy and delightful task.
2. *Outline for First Year or Ninth Grade.*
- a. Review the minor and chromatic scale.
 - b. Vocal drills with vowels e, a, o, ah and oo. Rapid scale practice with same.
 - c. Pantomime for enunciation.
 - d. Tone placing, forward tone, head tone for soprano.
 - e. Study many interesting songs and glees, national and patriotic songs of all lands.
 - f. Analyze songs — meaning of words, historical connection, setting, spirit and expression, phrasing and finish.
 - g. Easy choruses, part songs, and folk songs.
3. *Outline for Second Year or Eleventh Grade.*
- a. Drills same as Ninth.
 - b. More advanced songs and glees.
 - c. Studies in Musical History, evolution of modern musical instruments, biographies of the masters, growth of music.
 - d. General light chorus work.
4. *Outline for Third and Fourth Years, or Eleventh and Twelfth Grades.*
- a. Vocal drills continued.
 - b. Oratorios analyzed—selections used from the best known, such as St. Paul, Elijah, Creation. and Messiah.
 - c. Operas analyzed—selections used.
 - d. Stories of plots of operas in current use.
 - e. Sketches of great singers of the present.

- f. Occasional programs of great composers. Invite musical friends to assist.
 - g. Program of American composers.
 - h. Advanced choral work including the standard choruses.
- B. When music has not been taught in the grades below the high school.

1. *General Directions.*

- a. Pupils must be interested in singing.
- b. A dozen problems confront the teacher in this position that do not arise when music has been taught, such as prejudice, indifference, diffidence, untrained voices, and inability to carry a part other than the melody.
- c. Tact is required to meet and overcome all obstacles.
- d. High school pupils appreciate advanced music, although they may be unable to read it.
- e. The rudiments of sight reading must next be taught very thoroughly.
- f. Blend songs and easy choruses with the technical work to keep up the interest until the reading has been mastered.
- g. The songs will be largely note work at first.
- h. Use songs whose spirit and style have sufficient dignity to attract their attention and hold the respect of critical young people, yet simple enough to be within their reach.
- i. Be patient, enthusiastic and get results.

2. *General Work.*

- a. Teach scale as a tune, then syllables.
- b. From charts or blackboard present staff, clef, measure, meter signature, scale in all positions, kinds of notes, and rests.
- c. Teach different rhythms, easy exercises. reading rapidly in all keys. Pitch names, key signatures.
- d. Introduce part singing. From book read large numbers of carefully graded, progressive exercises.
- e. Teach easy chromatics, minor scales.
- f. Test voice. Place on part best suited for voice.
- g. Proceed as rapidly as possible to interesting part songs and choruses.

II. VILLAGE SCHOOLS.

- A. When music has been taught in the grades.
- 1. The work will be much the same as in the larger schools.

2. If there are pupils enough to form but one chorus, combine the work outlined for 9th and 10th grades.
 3. The work outlined for 12th grade will be found too difficult for small choruses.
- B. When music has not been taught.
1. The same difficulties exist as in city schools but are easier to overcome.
 2. Use same outline. Sing many patriotic and national songs, bright glees.

III. LIST OF COURSES SUITABLE FOR HIGH SCHOOLS.

Those marked by * are difficult. Those marked † are easy.

Ginn & Co. Coda.

† Anchored.

A moonlight Boatribe, (Miserrere.)

As Pants the Hart.

* Be Not Afraid, (Elijah.)

* Bridal Chorus, (Rose Maiden.)

† Come Flit Around.

Fairyland Waltz.

Football Day.

* Gloria, (Mozart.)

* Good Night Beloved, (Pinsuti.)

Hark Apollo Strikes the Lyre.

Heaven and Earth Display.

Let Love Undying.

† Night.

† Red Scarf.

Revel of the Leaves.

* The Heavens are Telling, (Creation.)

* Hallelujah Chorus, (Messiah.)

† Sleep While the Soft Evening Breezes, (Silver, Burdette & Co.)

* And the Glory of the Lord, (Messiah.)

Away to the Fields.

Boatman's Good Night.

* Damascus Triumphant March.

† Gallant and Gaily.

Great Dagon.

Little Jack Horner, (Caldicoll.)

Lullaby From Ermine.

† Merry June.

† Now the Music Soundeth.

O, Skylark for Thy Wing.

Rest Thee My Little One.

Unfold Ye Portals.

- * We Free Born Sons of Wodan Octavo.
- * Break, Break, (Maidlinger.)
- * Faithful and True, (Lohengrin.)
- * Cypsy Life, (Schumann.)
- * We Watching Over Israel, (Elijah.)
- * Hail Bright Abode, (Tannhauser.)
- * Honor and Glory, (Costa.)
- † O, Italia.
- * How Lovely are Thy Messengers.
Millan's Wooing.
Oh Hush Thee, My Baby.
- † Praise Ye the Father,²(Gounod.)
- * Song of the Mountaineers.
- * Spring Song, (Pinsuti.)
Spring Song, (Strauss.)
Stars of Summer Night, (Smart.)
- * Thanks Be to God, (Elijah.)
- * Waltz From Faust.
When Daylight's Going, (Somnambuli.)
- * Zion Awake, (Costa.)
- * The Cantata Ruth by Gaul.

MRS. FRANCES CLARK.

NOTE.—A valuable and suggestive paper on music was also contributed by Mrs. F. R. Davis, West Waterloo, Iowa.

ZOOLOGY.

I. THE TEACHER. The best way to deal with animal study when the teacher to whom the work is intrusted is inadequately trained, or not by nature endowed with a genuine interest in animal life, is not to teach it at all. Special training is just as necessary in the case of a teacher of Zoology as in that of a teacher of Latin, and it is far better to drop the matter entirely from the course than to have the child's conception of nature as manifested in living forms ruined by a faulty introduction at the outset. We assume, then, that the teacher has had a thorough course in Zoology or Biology in university, college or properly conducted normal school, and that he or she does not teach the subject under protest, but because a real love for the study of animals renders such teaching a pleasure.

II. THE OBJECTS TO BE ATTAINED SHOULD BE WELL DEFINED. There should be a clear conception in the mind of the teacher of what he is trying to do, and toward this end all the work should be intelligently centered. These objects are numerous, but there are

three which, in our opinion, are of paramount importance. These are.

1. *The cultivation of the power of observation.* The ability to see things, and to see them correctly, is not a natural, but an acquired faculty. It is quite exceptional to find either a child or an adult who has good observational ability unless that ability has been brought out by careful training. No study surpasses that of Zoology in its value in this direction when rightly used.

2. *The cultivation of the power of description.* This is still more rare in children, at least, than the preceding. Indeed, the deficiency is by no means confined to children. Not one in twenty university students is able to describe an ordinary object with any facility until he has been carefully trained. The power of good description is psychologically a very high one, acquired late by the race, and usually by the individual. For this reason the science of Zoology requires considerable maturity of mind, if the best educational results are to be obtained, and should come as late as possible in the high school course. The power of description should be very carefully trained by the teacher, who, if faithful, can thus secure psychological improvement of the utmost practical importance.

Animals usually have definite forms and colors and parts that lend themselves readily to concise description. But to secure this from the pupil requires all the firmness, patience, and tact that the teacher can command.

3. *The cultivation of the power of reasoning.* The student, having learned to see and to describe, should be led to think, to compare, to judge, and to infer. This is the crowning glory of the teacher's service—to stimulate thought, to induce in the pupil the habit, not only of asking, but of answering questions. Such questions as, Why is this so? How did it become so? Are these two organs really alike, or only seemingly so? Why are these two butterflies so alike in form and color while so different in anatomical details? How is it that the bones in my hands are so like those in the flipper of the seal? It is this part of the work that can be made the most fascinating to both teacher and taught. But it should be continually borne in mind that the pupil should be encouraged to answer his own questions, the teacher seeing to it that the proper facts be placed before him in the form of specimens if possible, and of books or lectures if necessary.

Hasty conclusions and generalizations should not be encouraged. An honest conclusion, although incorrect, may be of more educational benefit than a correct conclusion that is simply "jumped at."

III. METHOD OF TEACHING ZOOLOGY. While almost any method (except the text-book method) can be made to do good service in animal study, there are certain ways of teaching that

experience has proved to be of superior merit. Perhaps these may best be embodied in the following suggestions:

1. Study those forms of animal life that are most abundant in your vicinity and that can easily be secured and often brought alive into your classroom. The hydra, the clam, the earth-worm, the crayfish, the grasshopper, the perch, the frog, the garter snake, and the rabbit are almost everywhere available and form laboratory standbys that can hardly be dispensed with.

2. Study the external anatomy, the gross internal structure, and the life history as far as possible. Most of the more important anatomical points can be made out with the unaided eye or dissecting lens. These points are in general more available than the minute structure for attaining the educational advantages mentioned above. Moreover, they can be ascertained without expensive equipment, and therefore be at the service of all high school teachers.

3. We would recommend that most of the time devoted to the course be put in the study of invertebrate animals, because they are in general more conveniently secured and handled than vertebrates, they can be more easily dissected, and their study involves less pain to the animals themselves. A few typical vertebrates should also be studied, not because they furnish better educational drill, but because they afford a necessary introduction to human anatomy and physiology.

4. Some sort of guide or manual being usually necessary, we recommend as of special merit a little work called "Practical Zoology," by Colton (Heath & Co., Boston), as embodying our ideas as to the general method to be followed.

5. As may be inferred from suggestion 4, we do not recommend the use of the compound microscope in high school work, except as an occasional aid in special cases. We admit the fascination of the microscope and its indispensable aid in more advanced investigation, but regard it as most important that the pupil learn to use his eyes first, and to study the entire animal as a unit and its parts as organs, before being introduced to the histological structure, which logically comes last.

IV. EQUIPMENT. This will, of course, very greatly, according to the available funds and the ideas of the school board. Among the practically indispensable requisites, the following may be mentioned:

1. Laboratory tables, plainly and solidly constructed, the main requirements being a top that will not be injured by water, a good sized drawer for each pupil, and a good light. The size and arrangement of tables must be adapted to the shape of the room and the position of the windows.

2. *Dissecting Microscopes*. These should be as good as the state of the treasury will permit. This is the worst place to

practice economy, but if economy must be used, it should be borne in mind that a good dissecting lens is, in our opinion, better than an inferior dissecting microscope.

3. Dissecting tools, such as forceps, scissors, scalpels, needles, etc., should be furnished to each student; also at least one dissecting pan with a wax or cork bottom. Conveniences for washing and wiping the hands should not be neglected.

5. Specimens for study can, in most cases, be secured without expense if the teacher is energetic and the class genuinely interested. Living specimens can usually be secured by the students, except in the winter, if they are wisely directed. A large supply of reserve material in alcohol or formalin can be kept in store, the material being collected in spring, summer and autumn. Every opportunity to get students into the field should be utilized.

5. A collection of local animals can be made by the teacher and pupils and increased year by year. This is one of the very best methods of stimulating and sustaining interest and utilizing the out-door activity of the pupils. It involves, however, a good deal of work such as only the truly devoted teacher will carry to a successful conclusion.

Finally. The most should be made of every specimen, as an unnecessary destruction of animal life should never be permitted, much less encouraged, by the teacher.

(Where further details are desired, information should be secured from some one who has had considerable practical experience in conducting such work. In no case should an inexperienced teacher be allowed to order or select equipment without such aid.)

C. C. NUTTING,
GILBERT L. HOUSER,
M. F. AREY.

NOTE:—The chapter on Manual Training was intended to be placed in Part III, but by mistake in printing was inserted in Part I.

Part IV. (APPENDIX)

PHYSICAL TRAINING.

I, THINGS TO BE ACCOMPLISHED.

1. RECREATION. The actively working brain needs frequent resting so that worn-out tissue may be rebuilt. This recreation can often be most effectively accomplished by a change to physical work rather than by enforced inactivity.

2. BODILY DEVELOPMENT. By systematic physical exercise the weak body can be made active and muscular. Suitable "body work" increases the functional activity of internal muscles and glands.

3. MENTAL DEVELOPMENT. By the use of moderately complex movements the pupil should be taught to use mind and body together. The will, too, is strengthened by suitable gymnastic drill. Care must be taken not to add such work to already over-burdened pupils. Complex or fatiguing work should be used only with the greatest caution.

4. IN GENERAL. Seek to promote the growth of physically perfect men and women.

II. APPLIANCES.

1. APPARATUS. Good results may be obtained without the use of apparatus. It is possible to give a lesson in "freehand", one that brings into play all the muscles of the body with no apparatus whatever. Many exceedingly beneficial exercises may be taken while seated. If the means are at hand to procure apparatus, dumb bells, wands and Indian clubs in the order named are the most profitable.

2. SPACE. The lesson outlined below may be given with only the space afforded by the aisles between the desks. It is of the greatest importance to have the room well ventilated and free from dust.

3. MUSIC. Good music as an occasional accompaniment to exercise is a valuable addition. It is not necessary however. When movements are executed rhythmically the teacher may count.

III. QUALIFICATIONS NECESSARY FOR GOOD TEACHING.

1. An intimate personal knowledge of the pupil is necessary—his ability to resist fatigue, his mental temperament and his bodily defects. This knowledge is possible only for the grade teacher herself—considering now large town and city schools. The history of gym-

nastics in the schools seems to indicate that it is unwise to hire a special teacher of physical training who shall give lessons in each room. In the high school it is wise to depute some teacher, who seems the best fitted by nature, to undertake the direction of physical exercise. Her own ingenuity and such special training as she can secure will enable her to devise work that will be of great value to the pupils.

2. The teacher should be acquainted with the fundamental principles of physiology and hygiene, and especially with the physiological effects of exercise. Short talks on matters of personal hygiene will interest the pupil in the care of his own body.

IV. A TYPICAL LESSON IN FREEHAND FOR BEGINNERS.

Lesson One.

1. ORDER OF EXERCISES: Attention; arms out, front, up.
2. Leg: Rising on tiptoe, 16.
3. Neck: Clasp hands back of head and bend head backward against resistance, 8.
4. Arm: With arm out, clench fist, then flex arm at the elbow, 16.
5. Balancing: Toe stand.
6. Shoulder: Arms front, to out, 16.
7. Waist: Hands on hips, bend body to right and left. 12.
8. Back: Bend body to front, 16.
9. Heart and Lungs: Hopping on right foot, 24; left, 24.
10. Breathing: Arms up as lungs are inflated, down as they are deflated, 8.

V. METHODS OF TEACHING.

(a). Indoor Exercise.

1. Explanatory of above lesson: The order of arrangement of these exercises is based on physiological principles. This order should be maintained in all lessons. A great variety of lessons is still possible, all following this general arrangement. The figures following each exercise are the counts given to each. The number of counts may be varied to suit circumstances. Commands should be imperative. Accent the last word of command, as: Arms *up*, or Raise the arms on counts, *Begin*.

2. Position: The teacher should insist on a good position, chest raised, hips well back, weight on the balls of the feet. These are the important points in standing. Care should be taken to seat the pupils properly. A few minutes' daily work in calisthenics can not be expected to overcome the bad effects of a faulty position during the rest of the day.

3. Dress: The dress must be loose fitting to give opportunity for growth and movement.

4. Manuals: These are abundant. Care should be taken to procure something simple and logical. Proceed slowly to movements

a little more complex as your pupils and yourself become better prepared for them. Jessie E. Bancroft's "Freehand Gymnastics" and "Sight Apparatus Gymnastics" are excellent for grade teachers. From the simple movements described and illustrated in W. G. Anderson's "Gymnastic Nomenclature" combinations of any desired complexity may be built.

5. Calisthenics may become dry and uninteresting. Rely on them only as an alternative with out-of-door exercises frequently. Become interested yourself and your interest will be communicated to your pupils.

(b). *Out Door Exercise.*

1. It is a mistake to think that gymnastics can ever take the place of out door exercise. Play is all important for the young child. He is only happy when active and his activity is most beneficial when it is of the spontaneous, involuntary sort, and when taken out of doors.

2. The teacher should share in recitation. She may supervise and even join in the play without endangering her dignity.

Finally, we do not contend that a teacher can become an expert instructor of gymnastics in a few months. But she can do something at once; something that will be valuable for her pupils and that will aid her in her work as well. Many difficulties will be encountered but these are in the main more formidable in appearance than in reality. The end is worthy of the most painstaking effort.

PROFESSOR DAVIS, Iowa College.

THE INNER LIFE OF A HIGH SCHOOL.

The discussion and papers here presented are specially connected with the formal side of high school education, endeavoring to carefully point out all the fundamental and elective phases of secondary schools as found in Iowa cities and towns. The establishment and organization of these great agencies for good have therefore these definite designs in view. But there is much that is undesigned, which after all is specially effective in developing and training pupils of these important grades. Such powerful agencies constitute the inner life of the school and are the product of the best efforts of both teachers and pupils. Influences of this sort bring out character, test strength, measure manly and womanly gifts, original and acquired, and betoken leadership and promise in the life beyond school days. While not underestimating the work of school boards and teachers in bringing to bear upon the pupils the great designed influences already emphasized, it is certainly not necessary to forget what the students are gaining for themselves, socially, personally, intellectually and morally through the inner life of the school. The

teacher as a social and religious force can do much to elevate and encourage the pupils through the securing of self help and self dependence as well as self control. Among the influences that count the largest in the healthy development of the individual pupil is the spirit of his surroundings. This has a decided effect upon the student tendencies according as it stands for excellence in scholarship, high minded purpose and strength of character. The public opinion found among pupils practically determines the conduct and tendency of individual life and decides the ideas that are assumed as foremost in a pupil's career. The so-called college spirit that is marked by yells and confusion and organized enthusiasm, and that frequently contributes to recklessness and lawlessness, has no proper place in the conduct and inner life of a superior high school. These manifestations in American education, through athletic and other contests, while having something to do with developing zeal, power, skill and spirit, are frequently allowed to develop a disposition to scheme, to deceive and to practice fraud. The ambition to win at all hazards and by any methods, without regard to ethics or merit, is always to be treated as an evil tendency, greatly to be deplored. Hence the creation and development of an ideal spirit is the very highest aim of all the combined forces in secondary education as the formative period of youth gives promise of the largest and most effective returns for effort. School administration should never be allowed to get away from the great thought that high school work ought to be managed in character, purpose and ideals for the securing of those types of ambition, application, manhood and womanhood which are recognized as absolutely essential to the proper development of the best American citizens.

H. H. SEERLEY.

ATHLETICS.

This report would hardly be complete without giving the status of high school athletics and the consensus of opinion regarding these popular sports. There is a growing tendency for the high school to undertake the games that are common in colleges. This tendency must be regarded as a serious problem since neither school boards nor high school teachers have any legal authority to supervise or control these matters at the hours or in the places that these games occur, as the high school pupils are then under the direct control of their parents and the police power of their communities, the teachers not being able to efficiently employ more than moral or advisory control. Fatalities and accidents are reported more commonly from high school teams than from college teams because of their immaturity and unfitness for such violent exercises. The best informed physical directors and authorities on

athletics do not accept foot ball for men and basket ball for women as they are played in the colleges as at all safe or desirable for high school pupils, particularly if there are to be competitive games with other high school teams. Since the colleges have long since been compelled to repudiate all athletics not directly supervised by a competent physical director as dangerous to life and limb to full grown men, it certainly cannot be considered either safe or beneficial for high school teams, made up of immature and undeveloped young men and women, to be encouraged to continue an unregulated system of games that may in the end prove harmful and dangerous. This discussion does not undertake to treat the subject of college athletics, since that does not belong to this committee's work, and in recommending the control and regulation of all high school athletics with the elimination of every kind that endangers life or the limbs of the pupils, it is not to be understood that the college athletics as practiced are endorsed as being free from the most serious objections.

H. H. SEERLEY.

I. RULES GOVERNING THE ACCREDITING OF HIGH SCHOOLS.

High schools meeting the following conditions may, on vote of the Committee on Secondary School Relations, representing the college department of the Iowa State Teachers' Association, be accredited as affording their graduates full preparation for *one or more* college courses; and graduates of such schools will be admitted without conditions or examinations (except in certain subjects, e. g. English, as provided in the catalogs of the several colleges) to such college courses of study as their high school studies have prepared them to enter; provided they present certificates signed by the superintendent of schools or the principal of the high school, specifying in detail the amount and character of their preparatory work, as shown by the branches of study pursued, the length of time spent upon each, the ground covered in each, the text-books used, and the average standings attained, and specifically recommending the applicant as of good moral character, studious habits, and, judging from the previous records, able to carry on college work successfully.

1. The course of study must not be less than four years of thirty-six weeks each in length, following an elementary course not less than eight years of thirty-six weeks each in length.

2. The course of study must require of each pupil not more than four recitations daily.

3. The entire time of at least three teachers must be given to instruction in high school branches.

4. The quality of the instruction given and the character of the text-books used must be approved by the Committee on Secondary

School Relations. The present officers of this committee are: Chairman, President J. H. T. Main, Grinnell, Iowa; Secretary, Professor Thomas Nicholson, Mount Vernon, Iowa. The names of the committee in full will be found each year in the report of the Iowa State Teachers' Association, College Department.

5. Schools seeking considerable credit in science must demonstrate their ability to do successful laboratory work.

6. Schools seeking considerable credit in history and English must give evidence of a special library equipment for teaching these branches.

High schools maintaining courses of study less than four years in length, and employing less than three teachers, may by vote of the Committee on Secondary School Relations, be accredited as affording their graduates *partial* preparation for *one or more* college courses, provided they meet the following conditions:

1. The course of study must be the equivalent of at least one year of thirty-six weeks in length, following an elementary course of not less than eight years of thirty-six weeks each in length.

2. The course of study must require of each pupil not more than four recitations daily.

3. The entire time of at least *two* teachers for a *three-year* course, the entire time of at least *one* teacher with *half time* of another teacher for a *two-year* course, and the entire time of at least *one* teacher for a *one-year* course; must be given to instruction in high school branches.

4. The quality of the instruction given and the character of the text-books used must be approved by the Committee on Secondary School Relations.

5. Schools seeking considerable credit in science must demonstrate their ability to do successful laboratory work.

6. Schools seeking considerable credit in history and English must give evidence of a special library equipment for teaching these branches.

Private academies, seminaries, normal schools, or other secondary schools, meeting the conditions mentioned above, or their equivalent, may be accepted on the same basis as high schools.

The colleges composing the College Department of the State Association are: The State University; Cornell; Iowa College (Grinnell); State Agricultural College (Ames); Upper Iowa University; Iowa Wesleyan (Mount Pleasant); Parsons; Penn; Drake; Western; Des Moines College; Luther; Simpson; Tabor; Coe.

These have uniform entrance requirements, with very slight exceptions as noted on page 132. Every school on the accredited list can thus enter its students in some *one or more* of the courses of each of these institutions.

II. HOW A HIGH SCHOOL MAY BECOME ACCREDITED.

1. Either the superintendent of schools, the principal of the high school, or an officer of the Board of Education, may make application that a high school be accredited.

2. Either should write for the necessary application and report blank to the Professor of the Science and Art of Teaching of the State University, who is also the official recorder of the committee on Secondary School Relations representing the college department or to the present secretary of the committee, Professor Thomas Nicholson, Cornell College, Mount Vernon, Iowa.

3. This blank should be signed by the president and the secretary of the Board of Education, the superintendent of schools, and the principal of the high school. Full and detailed information concerning the teachers, pupils, and material equipment of the high school should be furnished according to the outlines given in the blank.

4. This application and report should be forwarded to the Professor of the Science and Art of Teaching in the State University of Iowa, or to the Secretary of the Committee on Secondary School Relations, as under 2 above.

5. There should be forwarded along with the application and report *two* copies of the high school courses of study, *corrected to date*.

6. An analysis of the courses of study will be made in the office of the official recorder of the Committee on Secondary School Relations, in such a way as to show their relation to the minimum requirements for admission to college; and a copy of the analysis will be sent to the superintendent or principal at once.

7. After the high school shall have been duly inspected, and after the inspector's report, together with the analysis of the courses of study, shall have been submitted to the committee on Secondary School Relations, the committee will accredit the school, if it shall appear that the conditions required shall have been met.

8. The committee desires to receive annually from accredited schools full reports as to teachers, pupils, courses of study, and material equipment in text-books, library, apparatus, and buildings, and to this end report blanks will be sent to each accredited school each year, shortly after the opening of the school year, from the Recorder's office at the State University. Further inquiries will receive prompt attention, as will also any correspondence relating to possible changes in our adjustment of courses of study looking toward the accrediting of any given school if the correspondence is directed to the Professor of Pedagogy of the State University, Iowa City; the Chairman of the Committee on Secondary Schools, Professor J. H. T. Main, Iowa College, Grinnell, or to the Secretary of said Committee, Professor Thomas Nicholson, Cornell College, Mount Vernon, Iowa.

ASSOCIATION COURSE OF STUDY AND ENTRANCE REQUIREMENTS.

So far as the Committee is able to ascertain, the course of study adopted by the General Association will enable a student to enter any of the colleges comprising the College Department of the State Teachers' Association in some of their courses, with the slight exceptions here to be noted. Superintendents, high school principals and school boards are urgently requested to secure copies of the catalog of each of the schools (the names are given in the chapter on accrediting) and carefully examine the entrance requirements. These will afford suggestions as to the allowable subjects most desired by the colleges and which should, if possible, be provided for in the high school college preparatory course. Subjects mentioned in the catalogs are desired, but the others are accepted as substitutes.

The colleges have made numerous changes in their entrance requirements to make them, as far as possible, uniform with the General Association course. The Association course *requires* only plane geometry, three terms' work (it provides for solid geometry as elective); whereas, the State University requires plane and solid geometry, four and one-half terms' work. As it has no preparatory course, the solid geometry must be made up if it is not taken in the high school before the student can fully enter Freshman. Cornell, Drake and some other schools have changed solid geometry to the Freshman year to accommodate themselves the better to the Association course of study. Again, the Association course requires English only $7\frac{1}{2}$ terms' work, whereas, after September, 1902, the State University, and doubtless, all the colleges, will require 11 terms' work in English. Some minor differences will be fully met if the amount of work outlined in the body of this Manual is done, as for instance, the State Association course requires an amount of Latin which is really the equivalent of $11\frac{1}{2}$ terms' work, whereas, the General College Entrance Requirements are 12 full terms' work. If the Latin outlined in the body of the Manual, page 52, is completed, the requirement will be fully met. This is true of some other subjects.

The President of Iowa College, Grinnell, writes: "Students who take the study outlined in the Manual will be able to enter the Freshman class without condition, providing they elect in the third and fourth years a second language, Greek, or German, or French. If they do not take this second language they will be admitted to *Freshman classification*, but with a condition of two years in the second language. The high school course, as provided in the Manual, is a very good preparatory course for Iowa College, provided the second language is elected."

Dean Hill M. Bell, of Drake University, writes, "We have been

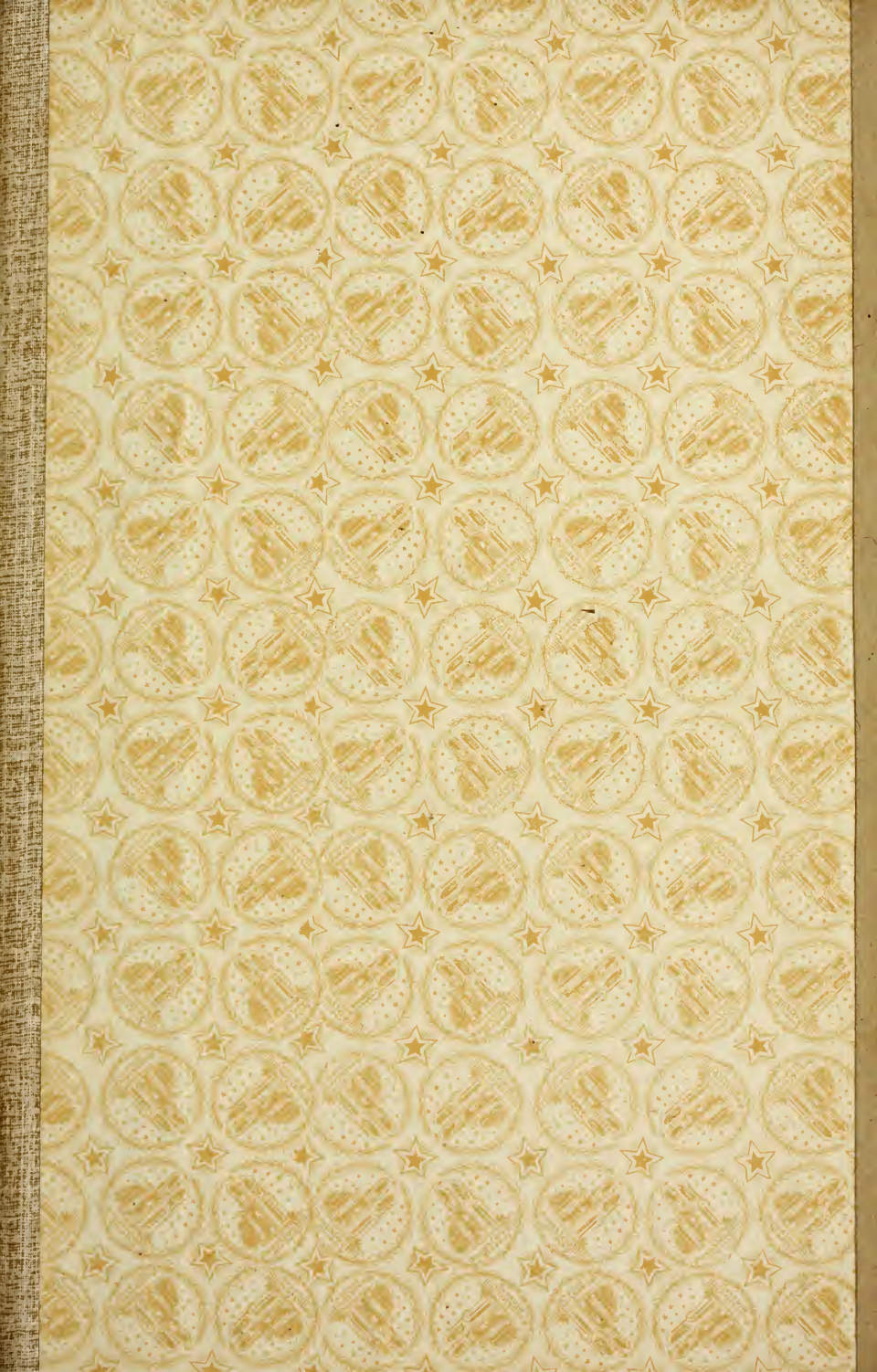
requiring all persons entering here to bring solid geometry, but our faculty has concluded that hereafter it shall be put in the Freshman year of the college. We do this in order to manifest our willingness to conform to the committee report and the State Association requirements. We feel that it is the thing for every college in the state to do."

These letters fairly represent the sentiment of the colleges toward the high schools. It is confidently expected that within the next year or two any little discrepancies which now exist will be arranged by mutual conference of the General Association Committee and the College Entrance Requirement Committee, so that the course of study outlined by the General Association will fully meet the entrance requirements of all the colleges. A little patience and consideration on the part of all concerned during the period of the adjustment of the infinite details and the many discrepancies which have been a cause of irritation in the past will ensure perfect harmony and good feeling between the colleges and the high schools in the very near future, and we shall have a perfect articulation of courses. Great advance has been made in this direction within the past five years."

The Committee looks forward to the publication of a new edition of this Manual with such minor changes in the course of study and the write-up in the various departments as experience and the practical attempt of our schools to carry out the suggestions here made may bring to them. It is hoped that such second and revised edition may be brought out within the next three years at least.







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